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HYDRO-ELECTRIC DEVELOPMENT IN THE HIGHLANDS

By George D. Banks

Early in March of this year, a man-made underground river for the first time poured its waters into a placid bay of Loch Lomond. In the hills above, Loch Sloy, its outlet blocked by a great dam and fed by additional streams whose courses had been changed, rose forty feet above its natural level and acquired new bays and promontories on the rocky shoulders of Ben Vane and Ben Vorlich. To meet the modern demand for electricity, the old order of things had been changed. These changes on Loch Lomondside are the result of operations being carried out by the North of Scotland Hydro-Electric Board who are engaged on a great programme to develop the water-power resources of the Scottish Highlands.

The North of Scotland Hydro-Electric Board was formed by the Hydro-Electric Development (Scotland) Act, 1943, which was passed by both Houses of Parliament without a division. This Act gave effect to all the main recommendations of a Committee set up by the Secretary of State for Scotland under the Chairmanship of Lord Cooper, which had carried out an investigation as to the best method of utilising Highland water power. The Cooper Committee were unanimous in recommending co-ordinated full development of the water-power resources. The Committee pointed out that Highland depopulation had already proceeded so far that even if the electric power could be generated free, its transmission and distribution to the scattered crofts and hamlets would make it impracticable for the electricity to be sold at a price which the inhabitants could afford without a subsidy. They suggested that, while Highland requirements should have priority, electricity surplus to the needs of the area should be sold to the electricity grid in the Lowlands so that revenue would be available by which uneconomic distribution of electricity in the remote areas of the Highlands could be financed.

The Board were given powers by the Act to carry out all future large-scale hydro-electric development in the North of Scotland and to supply: (1) the ordinary consumer in areas not supplied by existing

electricity undertakings, (2) these electricity undertakings and industry in the north, and (3) the electricity grid in Central Scotland. The Board was formed not merely to develop the water-power resources of the Highlands and Islands but also to assist in the regeneration of the area, and the Act placed on the Board an obligation to collaborate in the carrying out of any measures for the economic development and social improvement of the North of Scotland. Civil engineering works on a large scale, which are a necessary part of hydro-electric development, cannot be carried out without changing in some degree scenery and affecting fishing. The Act therefore also provided for the formation of an Amenity Committee and a Fisheries Committee to advise the Secretary of State and the Board on the preservation of scenic amenity and fisheries. In addition to having the advice of the two statutory committees who are consulted during the preparation of schemes, the Hydro-Electric Board also retain their own specialist advisers and consultants. They have also a panel of eminent Scottish architects to advise them on the architectural features of power stations and other buildings.

Provision was made in the Act to protect the interests of land-owners and other people who might be affected by the new developments. When the Board promotes a scheme, forty days are allowed in which objections may be lodged with the Secretary of State, who may decide to hold a public enquiry. When a scheme is approved by the Secretary of State, it has to lie before Parliament for another forty days during which a prayer for its annulment may be presented.

The Board's first task was to survey their area and estimate its water-power potentialities. In 1921, a Committee known as the Water Power Resources Committee had estimated that the total water-power resources of Scotland amounted to 1,880,000,000 units per annum. In 1938, the Highland and Islands Economic Committee estimated that the undeveloped resources were 1,972,000,000 units per annum. In 1942, the Cooper Committee raised this estimated figure to 4,000,000,000 units.

The Board's engineers, however, estimated that Highland lochs and rivers could produce 6,274,000,000 units of electricity annually, a total which is about one-seventh of the amount of electricity consumed in the whole of Great Britain, and the Board drew up a development programme which envisaged the harnessing of these resources by more than 100 hydro-electric schemes. Detailed surveys may show, however, that the water-power resources of the area are very much greater than this figure.

In 1947, the Electricity Act which nationalised Britain's electricity supply industry came into being. The Hydro-Electric Board, because of the special problems of their area, were left out of the national pattern. The undertakings of 16 private companies and local authorities were vested in the Board, and their area was extended to 21,750 square miles lying north and west of a line from the Firth of Tay to the Firth of Clyde. Although the cities of Aberdeen, Dundee, and Perth are contained in this area, it includes all the sparsely populated mountainous regions and the islands of the west and the north. The

area is three-quarters of the total area of Scotland or nearly one-quarter of the total area of Great Britain, but its population is only one-quarter of the total in Scotland and 2½ per cent. of the total in Great Britain.

In this area, the Board are empowered to generate, transmit and distribute electricity, duties which are carried out jointly in the rest of Britain by the British Electricity Authority, who generate the electricity and transmit it at high pressure through the national grid, and fourteen Area Boards who distribute and sell it to the consumer.

The main resources of water power in Britain lie in the Scottish Highlands. There are, however, no great river basins such as exist in the United States, Canada, and other continental countries, and no lochs at great heights as there are in Norway, Sweden, and Switzerland; the Lawers scheme, where the storage reservoir will be some 1,300 feet above the generating station, has the highest head so far of the Board's projects. The new hydro-electric schemes may therefore appear small in comparison with those in many other countries; they have, however, a special interest of their own because of the diversity of problems which each scheme presents, and because the topographical and geological nature of the Highlands demands that considerable ingenuity and skill be used to divert waters from areas of high rainfall to places where it can be stored. Most Highland rivers are 'flashy' streams, the summer flow of which may fall to one-fifteenth of the average flow and the winter flood flow may be as much as three hundred times the dry weather flow in summer, and as there are in Scotland no glaciers and extensive snow fields which maintain river flows in times of warm dry weather, it is essential in most of the schemes to have reservoirs in which sufficient water can be stored to tide over unpredictable periods of drought. By trapping and diverting water from one watershed to another a very much greater output of electric power can be assured than would be possible were this not done.

By the beginning of 1950, the Board had promoted 19 schemes involving the construction of 29 generating stations with an estimated annual output of about 1,600,000,000 units and a kilowatt capacity of approximately 630,000. The total output and kilowatt capacity of all schemes—those under construction, those on which work has not yet started and those which are being surveyed—is 3,017,500,000 units and 1,041,750 kilowatts.

When the schemes which have been published are completed, new features in the Highland landscape will include, in addition to those 29 generating stations, about 30 dams and weirs, about 136 miles of new or reconstructed roads, new bridges, new hamlets; 14 new lochs will be formed and 13 others enlarged.

Schemes in Operation

The first of the new hydro-electric stations came into operation in December 1948, one at Morar in Inverness-shire and the other at Lochalsh in Ross-shire. These are small schemes, to provide supplies to the surrounding districts. The Morar scheme uses the water of the River Morar which flows from Loch Morar, the deepest loch in

Electric generating stations and transmission lines in the Highlands.

Britain, to provide electricity for a coastal area of about 71 square miles. The power station has been built in a cavern excavated in a knoll beside the Falls of Morar, and little more than the doorway and retaining wall is visible. A fish pass has been built to enable sea trout and salmon to surmount the small weir above the Falls. The Lochalsh scheme has resulted in the formation of a placid loch among the upper hills in Glen Udalain, and the small power station has been built of local stone at Nostie Bridge, 490 feet below. By means of submarine cables, the Lochalsh scheme is supplying electricity to the southern part of Skye as well as to the Loch Carron and Loch Duich districts.

Schemes under Construction

Nine schemes are under construction at the present time: at Loch Sloy, Tummel-Garry, Glen Affric, Loch Fannich, Glen Shira, Cowal, Glen Lussa, Storr Lochs and Gairloch, work which involves the building of 13 dams and 12 generating stations and the driving of about 50 miles of tunnels.

Loch Sloy.—The first big scheme to be started was the Loch Sloy scheme, the main works of which are situated in the mountains lying between Loch Lomond and the heads of Loch Long and Loch Fyne. Loch Sloy was a small loch 780 feet above sea level which drew water from an area of 6½ square miles, but when the Board's scheme is complete, streams in an area of 32½ square miles will be diverted by means of tunnels and aqueducts to the loch whose surface level will be raised by about 150 feet. The gap between the mountains at the outlet of the loch has been closed by a dam, 1160 feet long and 160 feet high, which is nearing completion. A tunnel, two miles long, horse-shoe in shape with a diameter of about 16 feet, has been driven through Ben Vorlich, a task which involved 1700 blasting operations and the excavation of 158,000 tons of rock. The water is led through this tunnel and down pipelines to the generating station on the banks of Loch Lomond. The first turbo-alternator in this station began to operate in March of this year, and the other three machines will be put into service as they are completed during the summer and autumn. The Loch Sloy scheme is designed to supply electricity to the industrial area of the west of Scotland when the demand for power is at its peak, and its estimated annual output is about 120,000,000 units. The Board are building a little group of stone houses for their staff at Tarbert village, the first of many developments of this kind which will stimulate life in small Highland communities.

Glen Shira.—The electricity produced by other schemes in the vicinity of the Loch Sloy scheme will be transmitted to the switching station which has been completed in the glen below the Loch Sloy dam and from which transmission lines have been erected to Windyhills, near Glasgow. One of these schemes which is under construction is the Glen Shira scheme near Inveraray which, with the small Allt-na-Lairige scheme on which work has not yet begun, will produce about 100,000,000 units of electricity annually by harnessing the upper waters of the River Shira and the River Fyne. There will be two dams in the Glen Shira scheme, the larger about 130 feet high and

2250 feet long, and a smaller dam which will be built in two sections, one of concrete and the other an earth bank. These two dams will form two new lochs. Between the upper and the larger loch, which will lie 1125 feet above sea level, and the lower loch, which will be about 965 feet above sea level, there will be a small generating station and the water will flow from the upper into the lower loch through this station. Provision has been made for the installation of a pump in this station to enable water to be pumped from the lower into the larger top reservoir. The water from the lower loch will pass through 4 miles of tunnel to the main generating station which will be situated near Clachan at the head of Loch Fyne and will be built in an excavation in the hillside.

Tummel-Garry.—In Perthshire, the Board are engaged on the construction of the Tummel-Garry scheme which aroused considerable controversy when it was promoted in 1944. This scheme will utilise the waters of the River Tummel and its tributaries to produce about 300,000,000 units annually, and it is a logical development of the Rannoch and Tummel hydro-electric schemes which were constructed by the Grampian Electricity Supply Company in the early 'thirties and which are now under the Board's control. The constructional work being undertaken by the Board is situated downstream from these earlier stations. The work involves the construction of three dams and three power stations and the driving of tunnels and aqueducts for a total distance of more than 20 miles. The total catchment area is 706 square miles. The highest reservoir will be situated on the upper reaches of the River Errochty, a tributary of the River Garry, where a dam 1310 feet long and 127 feet high will form a new loch three miles long with a top-water level nearly 1100 feet above sea level. A 12-miles-long aqueduct and tunnel will collect water from the upper reaches of the Rivers Bruar and Garry and some of their tributaries and lead it into the new loch. Another tunnel, 5 miles long, will take water from the storage loch in Glen Errochty to the Errochty power station which will be situated in an excavation in the hillside on the shore near the western end of Loch Tummel. The work of driving the main tunnel and the excavations for the dam and power station are in progress. The Clunie dam at the eastern end of Loch Tummel will raise the level of Loch Tummel about 17 feet and more than double its length. This dam, which is nearly complete, lies in the gorge of the River Tummel about two miles from the natural outlet of Loch Tummel. To enable salmon to surmount the dam, which is 65 feet high, a fish pass 880 feet long, consisting of over 30 concrete chambers and three resting pools, has been provided. From the dam, a 2-mile tunnel leads the water to Clunie power station. This tunnel, which is of horse-shoe section with an equivalent diameter of 23 feet, is the largest water tunnel in Great Britain, and when the station is operating on full load about 2,500,000,000 gallons of water per day will pass through it. About 400,000 tons of rock had to be excavated to drive this tunnel.

At the junction of the River Tummel and the River Garry, the Clunie generating station is situated. One turbo-alternator in this

station began to operate in April and is providing power to the Board's network in the Central and Southern Highlands and to the industrial Lowlands. The other two sets will be operating before the autumn.

After passing through the turbines of the Clunie power station, the water will discharge into a new loch which will be formed by the Pitlochry dam situated two miles downstream near the outskirts of the town. The Pitlochry dam is designed to even out the flow of water in the River Tummel below Pitlochry. It will form a winding loch in the river valley and in effect will return the river to a level which it attained in prehistoric times as is shown by the terraces which are a feature of the landscape of this valley. At the Pitlochry dam a fish pass has also been constructed, and incorporated into the dam structure is a generating station.

Mullardoch-Fasnakyle-Affric.—North and west of the Great Glen there are great sources of hydro-electric power. In Glen Affric, a large scheme is under construction, known as the Mullardoch-Fasnakyle-Affric scheme, which will use the water of an area of 124 square miles for the production of about 250,000,000 units annually. Before the formation of the Board, in 1928 and 1941 schemes were promoted to produce electricity from this area, but these were turned down by Parliament. The earlier promotions proposed to raise the level of Loch Benevean to that of Loch Affric, making one large sheet of water that would have submerged all the scenic features which have made Loch Affric famous as one of Scotland's beauty spots. The Board were faced with the problem of using the waters of this area and at the same time preserving the beauties of one of the finest Highland glens. Their scheme leaves Loch Affric unaffected. A small dam is being built in the gorge below the outlet of Loch Benevean and the level of this loch will be held within moderate limits. The storage which has been lost in Loch Benevean and Loch Affric will be recovered by the Board who are constructing a high dam, 2385 feet long, at the outlet of the more isolated Loch Mullardoch in Glen Cannich. The waters of Loch Mullardoch will be raised so that this loch and Loch Lungard will become one sheet of water. A 3½-miles-long tunnel will carry water from Loch Mullardoch to Loch Benevean, and a tunnel of the same length will carry the water from Loch Benevean to the power station at Fasnakyle in Strathglass. At the little hamlet of Cannich in Strathglass, the Board are constructing staff houses which will be built of local stone, and use has been made of local stone to construct substation buildings and to face the Fasnakyle power station.

Conon Basin.—At Loch Fannich in Ross-shire another large scheme is nearing completion. The Fannich scheme is the first stage in the development of the waters of the River Conon basin, a group scheme with an annual output of about 435,000,000 units which will be one of the most important in the Board's area. The second stage, the Glascarnoch-Luichart-Tor Achilty scheme with 4 generating stations and 6 main dams, has been approved by Parliament, but work on this part of the development has not yet started. No dam is being built meantime at Loch Fannich, but an opening will be blasted in the bed

of the loch under which a tunnel has been driven, and this tunnel will lead the water 4 miles to the generating station at Grudie Bridge. Later, a dam will be built to increase the storage in Loch Fannich. The electricity produced by the Fannich scheme, which will start operating during the summer, will be transmitted to the north-eastern part of the Board's area. A third section of the Conon group of schemes —the Orrin scheme—is being surveyed by the Board.

Cowal.—A number of small schemes are also under construction to supply isolated districts, the largest of these being the Cowal scheme at the head of Loch Striven, involving the formation of a new loch in Glen Tarsan which will impound the waters of the River Tarsan and head waters of the River Lean. Additional water will be brought into this loch by tunnel and aqueduct from other streams. The power station has been constructed at the head of Loch Striven and the turbines will discharge directly into this sea loch. This station, with an annual output of about 13,500,000 units, will serve the district of Cowal and the islands of Bute and Cumbrae by means of a network of 250 miles of high- and low-voltage distribution lines.

Gairloch.—On the west coast of Ross-shire, the Gairloch scheme, which will harness the waters of the River Kerry at the outlet of Loch Bad-an-Sgalaigh, is under construction, and on the Island of Skye the Storr Lochs scheme, which will involve the raising of Loch Leatham to that of Loch Fada, is also in progress. The generating station of this scheme which will supply the whole of the island will be situated on the sea shore near the mouth of the Bearreraig river.

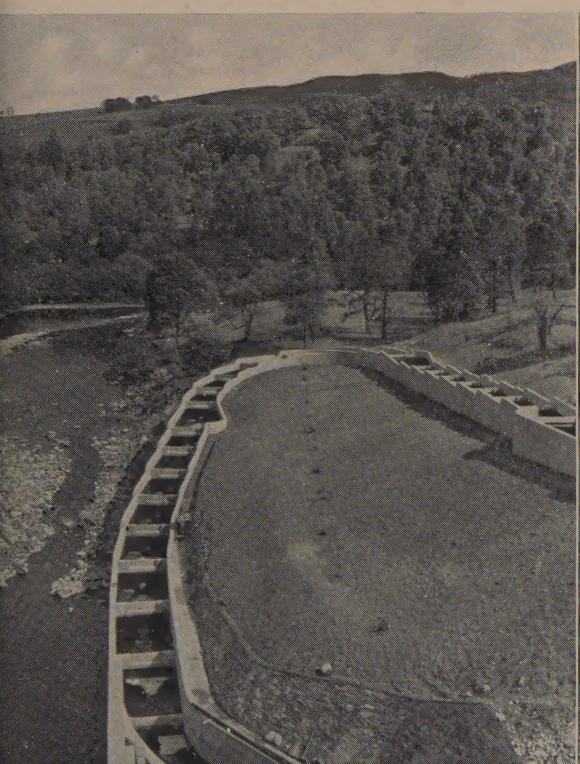
Glen Lussa.—Another small scheme under construction is situated at Glen Lussa on the Kintyre peninsula. This scheme will form a loch about 2 miles long in Glen Lussa and the generating station will be about 450 feet lower down the glen. This scheme will supply electricity to Campbeltown and the coastal villages, farms and cottages on both sides of the peninsula, and the distribution lines will link it with the scheme at Glen Shira.

Schemes not yet under Construction

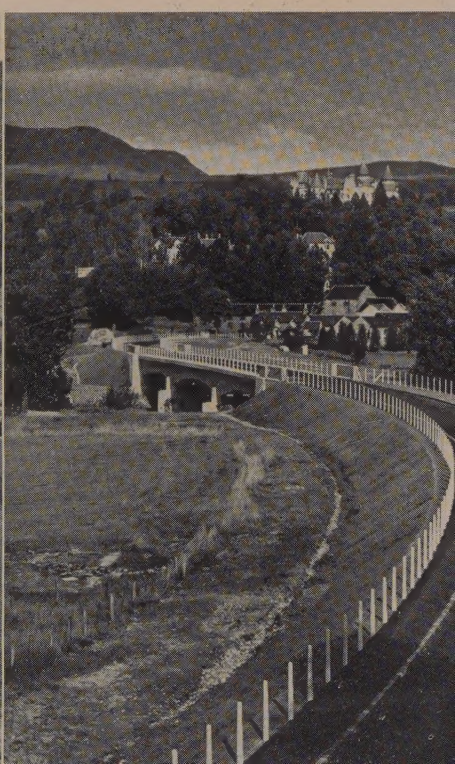
Glen Moriston.—Two large schemes upon which work has not yet started are the Moriston and Garry schemes which will be situated in Glen Moriston and Glen Garry. The River Moriston and its tributary, the River Loyne, provide the source of power for the Moriston scheme. The harnessing of these waters was proposed in a series of unsuccessful private Parliamentary promotions—the West Highland Power Bill of 1923 and the Caledonian Water Power Bills of 1936, 1937, and 1938. The Board's development differs from these earlier promotions principally in that the amount of compensation water is between five and six times as great. The scheme provides for two large reservoirs, Loch Loyne and Loch Cluanie. Three principal stations, Ceannacroc, Dundreggan, and Invermoriston, will operate on the main flow of the River Moriston, and two subsidiary stations, Doe and Livishie, on tributaries. In normal operation, the storage in Loch Loyne will be drawn down on first, and only when Loch Loyne has been drawn down will there be any lowering of the level of Loch Cluanie. The remaining

PITLOCHRY DAM AND POWER STATION

FISH PASS AT CLUNIE DAM



NEW BRIDGE AND ROAD AT PITLOC



CLUNIE DAM

LOCH SLOY DAM

LOCH SLOY AND DAM

PIPE-LINE AND GENERATING STATION, LOCH LOMOND

RIVER MORAR: GENERATING STATION

MULLARDOCH DAM

two reservoirs will be in lower Glen Moriston and will be kept nearly at constant water level.

Loch Loyne will be raised in level and the water will be fed by tunnel to Loch Cluanie whose level will also be raised by a dam, and, from there, the water will be led by tunnel and pressure conduit to a generating station near Ceannacroc Bridge. On the lower reaches of the River Moriston two dams will be constructed, one near Dundreggan and the other about two miles upstream from Invermoriston. The top-water level adopted for the upper reservoir is such that there will be considerable saving of agricultural land compared with previous schemes, while the presence of the lower one ensures a much shorter length of river in which the flow will be reduced. The Dundreggan dam will serve a power station on the upper reaches of the loch formed by the Moriston dam. A tunnel and pressure conduit will convey water from the Moriston dam to the Invermoriston power station.

Glen Garry.—The Garry scheme will use the waters of the River Garry in Inverness-shire and its tributaries, the Rivers Kingie and Gearr Garry. This is also a catchment area which figured in the unsuccessful West Highland and Caledonian Water Power Bills, and here again the Board's scheme provides for five or six times more compensation water than was proposed in the last promotions, and provides, in addition, for taking the impounded waters of Loch Quoich to the east, its natural course, and not to Loch Hourn on the west coast. The scheme authorises the construction of two main dams, one at the outlet of Loch Quoich and the other at the mouth of Loch Garry. A power station will be supplied from each of these dams, and there is provision for a subsidiary development centred on Loch Lundie. The first of the dams will be across the Gearr Garry at the eastern end of Loch Quoich. From this storage reservoir the water will be led through a generating station on the shores of Loch Poulary. The second dam is to be at the eastern end of Loch Garry. From Loch Garry, the water will be conveyed to Invergarry power station on the north bank of the River Garry, near its outlet into Loch Oich in the Great Glen.

Moor of Rannoch.—In Perthshire, there are two other schemes not yet under construction. One of these is the Gaur scheme which is the first part of a three-stage development on the River Gaur which will utilise the run-off from a large part of the Moor of Rannoch. The dam will be built at the eastern end of Loch Eigheach, which will be almost doubled in size, and the generating station will be on the banks of the River Gaur.

Future developments will impound the waters of Rannoch Moor in Loch Laidon to provide increased storage.

Lawers.—The Lawers scheme will make use of Lochan na Lairige, a small loch 1620 feet above sea level at the high pass between Loch Tay and Glen Lyon. This loch will have its level raised to 1710 feet above sea level to provide a gross head of 1362 feet in the power station which will be built near the Killin end of Loch Tay. Interception aqueducts at elevations from 1720 feet to 1850 feet above sea level will increase the catchment area of the loch by diverting into it the head waters of hill streams off Ben Lawers and adjacent peaks.

Ullapool.—There is also another small scheme in Ross-shire which provides for the harnessing of a number of small lochs in Strath Kanaird about 4 miles north of Ullapool.

Some Effects of the Schemes

The construction of these projects is having some interesting indirect results. One of these is that our store of knowledge of Scotland is being increased. For example, in the preparation of a hydro-electric scheme, it is necessary for the engineers to obtain data of rainfall and run-off, its distribution and volume, and in isolated parts of the north records are being obtained from 110 rain gauges, 70 of which have been set up by the Board. It is also necessary to obtain other hydrological data such as the flows of rivers and streams, both rate and volume, peak flows and annual distribution ; last year, river flow records were taken at 44 river gauging stations. Detailed geological surveys are being carried out to fix the position of dams and the routes of tunnels, and the excavation of power station sites, surge chambers, and the driving of many tunnels have provided geologists with information.

The Board's schemes when completed will exercise a considerable measure of control over the floods which cause great damage to agriculture in many Highland straths. The reservoirs will also act as traps for the sand and silt which at the present time are washed down to the sea and in many places, particularly on the north-east coast, have filled up estuaries and harbours.

The construction of the hydro-electric schemes is attracting large numbers of tourists to the Highlands. Last year, about 6,000 people came north to see the works, and among these ' official ' visitors there were representatives of 16 foreign countries. Many of these visitors were foreign buyers and some were representatives of foreign countries, dominions, and colonies interested in hydro-electric development, for these new schemes are already acting as a shop window for British electrical, mechanical, and civil engineering skill. Almost on the doorstep of famous British engineering works engaged in the construction of turbines and electrical plant, the foreign buyer will be able to inspect plant of all kinds operating under various conditions. No country, not even Switzerland, will have such a diversity of plant of modern design.

Distribution of Electricity

At the present time, public attention is drawn to the great constructional works required for the generation of power, but the distribution of electricity to the isolated crofts, farms, and villages is bringing about the greatest change of all to the Highland scene. From the Mull of Kintyre to Shetland, from Lewis to Buchan, distribution lines are being extended. The first distribution scheme was published by the Board in 1946, and the first village to receive a supply from the Board, the little hamlet of Finstown in Orkney, received a supply in December 1946. In January 1947, Plockton in Ross-shire was the first village to be connected on the mainland. In 1948, 78 hamlets

and villages received a supply for the first time, and last year 62 hamlets and villages were provided with a service. In 1948, 16,000 consumers, or approximately 45,000 people, were connected for the first time, and in 1949 the number of new consumers connected was 18,000 which represents approximately 60,000 people ; the total for 1949 included 550 homes and other premises in Orkney, 543 in Lewis, 379 in Shetland, 279 in Skye and Lochalsh, 110 in South Uist and 1000 in the eastern part of the country north of the Great Glen. In 1948 street lighting was introduced into 9 villages and last year into 18. The Board were supplying 222,174 consumers at the end of last year.

In the distribution of electricity the Board has problems without parallel anywhere in Britain. One has only to look at a map of the west coast of Scotland to realise the difficulty of supplying isolated communities. The coastline is deeply indented with sea lochs and there are hundreds of islands, few of them with any water-power resources and most of them too far from the mainland and too thinly populated to justify the laying of submarine cables from mainland power stations. To provide some of the islands with electricity, the Board have erected diesel generating stations and on others they have extended existing diesel stations. The growth of load on many of the larger islands, such as South Uist, Lewis, Mull, Orkney and Shetland, has been such that the Board have found it necessary to erect large new diesel stations. The nature of the country with its rocky outcrops, shallow soil and sodden peat makes the erection of distribution lines difficult and expensive.

A great volume of development still remains to be carried out in the whole of the Board's Area. The districts still to be served have a sparse and scattered population, and this makes for very costly work, so that extensions to provide all the new supplies that are needed will have to be spread over many years. The number of consumers and the revenue to be expected per mile of distribution line are much less in the Board's Area than in the rest of the country, but the Board regard it as a matter of great importance to assist agriculture and the economic life of the Highlands by providing electricity.

The Highland people, contrary to the prophecies of some critics, are taking advantage of electricity. Highland housewives have played a leading part in this development and by the end of last year, in the west Highlands and Islands, the percentage of housewives cooking by electricity varied from 30 to 57 per cent. Many of the cottages in the west coastal districts have more electrical apparatus than many city flats. Farmers are also fully alive to the advantages of electrification in the preparation of feeding stuffs, in the barn, in the dairy, in poultry houses and the hundred and one ways in which electricity can ease the daily tasks on the farm. Hotel and boarding-house keepers are installing electric cookers, washing machines, refrigerators, bedroom fires and other equipment, services which are expected as a matter of course by tourists and which will help to bring catering establishments in the north into line with city hotels. Already there are signs that small industries in the Highlands will take full advantage of the facilities provided by electric power. In 1948, 29 small indus-

trial concerns were given a supply for the first time, and last year the number of firms supplied for the first time totalled 54 and included firms engaged in the production of potato crisps, deep freezing of food-stuffs, hosiery and tweed.

Another important part of the Board's programme is the erection of a Highland grid to connect the major stations with one another, with the industrial areas of North-East Scotland and with the British Electricity Authority's national grid in Central Scotland.

Other Activities of the Hydro-Electric Board

The Board are not restricting their efforts to the harnessing of Highland rivers. They are also associated in research into the utilisation of wind power and peat for the generation of electricity. The Board have placed an order with John Brown & Co. Ltd., for a windmill of 100-kilowatts' capacity which will be set up on Costa Hill in Orkney where wind measurements have been made, and the electricity produced by this experimental windmill will be fed into the Board's Orkney distribution system. It is hoped that the windmill will be complete and ready for running trials by the end of this year.

The Board are represented on a Government Committee which is investigating the utilisation of peat in the gas turbine. Experimental work is well advanced in connection with the construction of a special heater to be fired by peat fuel which will be used in conjunction with an experimental closed cycle gas turbine. This work is being carried out under the general direction of the Board at the works of John Brown & Co. Ltd.

The decision of the Board to use Scottish stone where possible in the construction of their buildings will be welcomed by all who have been concerned at the decline in the number of stone masons in Scotland. Already stone masons are at work at Tarbert and Pitlochry on the construction of staff houses. At Beauly and at Fasnakyle substations have been built of local stone. The Gairloch generating station is being built of local stone and at Kirkwall a diesel station will also be built of local stone. The Board intend in the future to make use of stone from quarries in Ross-shire and Morayshire in the construction of several generating stations in the north-east.

The Board have encouraged the establishment of a new industry in Scotland, the manufacture of large hydraulic plant. The firms engaged in this new industry have received orders for 895,540 horse power of water turbines and 368,400 kilowatts of generators from the Board. A further important result has been that large orders for export have also been brought to Scotland, aggregating about 970,000 horse power of water turbines and 209,000 kilowatts of alternators.

The Hydro-Electric Board's programme to use the water-power resources of the North of Scotland for the generation of electricity is a long-term one and one which is still in its early stages. Already, however, it has done much to stimulate the economic life of the Highland people and to improve their living conditions and has brought increased trade and employment to other parts of Scotland.

THE POPULATION OF SKYE

Newbigin Prize Essay, 1949

By A. T. A. Learmonth

Skye, the ' winged isle,' has many peninsulas and a coastline several hundred miles in length. There are several narrow ' waists ' of land, which are conducive to regional diversity within the island area of some six hundred and seventy square miles. The seemingly irregular shape may be contained by a rectangle twice as long as broad, and with the long axis lying about NNW-SSE.

The island's 3000 homes for its 9000 people are notably peripheral in distribution, and for the most part are clustered in rather isolated groups. These tendencies have persisted for centuries.[1] In detail the pattern is usually rather linear within these ' cells,' loosely strung along tillable glen or shoreward flat or slope, each house on its croft. In much of Trotternish [2] this linear trend amounts almost to a rural ribbon development. As more than seven-tenths of the people live on the crofts, and partake in some degree of the still distinctive crofting way of life, even if few are wholly dependent on it, this essay is largely devoted to an integrated account of their economy and society seen in their setting.

The position of Skye is marginal to industrial Britain, which has drawn away so many of its people in the past, and which still attracts many of the small and dwindling number of young people. Industrial Britain, too, takes much of the island's produce, and supplies much of its needs, even, for instance, much of its bread. Imports and exports are subject to heavy freight, and often also to motor-carrier's charges for transport to or from the port in Skye.

The island's situation was much more central in relation to the " abortive Far Western Christian civilisation," as Toynbee has called it, the remnants of which may yet prove not without value to the modern world. It was more central, too, in relation to the maritime Norse Empire, and to the sphere of influence of the Lord of the Isles, whose descendant, Lord MacDonald, still has large estates in the island.

The westerly and westward-facing position of Skye—in relation to Europe—recalls the stream of emigrants forced, or ' assisted by the munificence of ' the clan chiefs, to go to North America, and less to Australia, as the clan system broke down, with a maximum at the time of the clearances for sheep.

The sea appears at first sight to play a very small part in the life of the modern Skyeman. There is little full-time or even part-time fishing for the market, boat-building is all but dead, sea-ware is little used for the fields. All these are anomalies in an island with such a long coast including some fine harbours, doubtless to be explained in part by distance from markets. But they perhaps conceal the real importance of the sea, which does seem to be in the Skyeman's blood.

The young men own or have access to a small boat, with oars or an outboard motor, and love to be on the sea to fish for the household. Many Skyemen are merchant seamen, whose wives carry on the croft while they are away. Few places are out of sight and easy reach of the sea.

Fig. 1. Isle of Skye.

I

An Analysis of the Environmental Factors

Landforms and population density.—The landforms (Fig. 2) may tentatively be summarised as consisting of several Tertiary erosion surfaces, post-volcanic but pre-glacial.[3] The highest is dissected maturely, the lower ones are submaturely or youthfully eroded. The drainage shows much adjustment to trend lines, mainly NNW-SSE and ENE-WSW, and some about E-W—clearly seen in air photographs—and often with intrusive dykes, the weaker rock allowing erosion to attain this adjustment. This drainage pattern, however, has

been much upset by glaciation, giving many bogs and lochs in the present landscape. The low ground, under about 400 feet, is largely peripheral, but certain through valleys have been carved by normal and glacial erosion. The last major movement relative to the sea was downward, giving a broadly youthful drowned glaciated coast, with cliffed headlands and bay-head accumulation. Partial recovery accounts for raised beaches and related benches and terraces, and for the generally youthful lower courses of the numerous streams.

Relief, with climate, soils and vegetation, in conjunction also with the traditions of the inhabitants, almost rigidly determines the sites of settlements. The age-old cattle raising with subsistence cereals has given way to cattle and sheep rearing for export as a main cash crop, or to supplement the remains of the old subsistence economy.

Surfaces over about 400 feet are virtually without cultivation or settlement, and Fig. 3, showing old cultivation ridges, suggests that this tendency has long existed, as also does the archaeological evidence already cited.[1] The people are, however, dependent on much more extensive areas of ' the hill,' beyond this altitudinal limit ; the most useful hill grazings are generally of slightly sloping surfaces under 1000 feet, exceptionally 2000 feet.

The peripheral settlement and arable areas are on the dissected slopes of upraised surfaces, glen sides, and on raised beaches (Fig. 2). There is some interior settlement in glens, through valley or ' waist ' sites, and Fig. 3 shows that these were formerly more numerous. Very flat facets are avoided. There is some correlation, then, with structure lines excavated by normal and glacial erosion.

The rivers are of some importance as being one of the attractions for the tenant of the sporting estate, and more recently as a source of hydro-electric power.[4] But the rivers are on a very small scale, especially in the lava-flow peninsulas.

The drowned coasts give some good harbours on the east coast, and also on the west coast in valleys following the important trend NNW-SSE, and giving much shelter from the frequent SW gales. On these lochs, and near good fishing grounds, the presence of a bay-head beach up which boats might be hauled added an advantage to some settlement sites ; these are not on the area of salt-marsh at the head of lochs but, rather, on dry slopes or raised beaches.[5] Fig. 3 and archaeological evidence suggest that avoidance of peninsular sites on cliffed headlands was less marked in former times.

The appeal of Skye to tourists is largely due to its scenery. Especially attractive are its higher surfaces, over 2000 feet, when picturesquely eroded. Well-known examples are the rugged relief and serrated skylines of the gabbro laccolite, weakened by intrusive dykes and cone-sheets to give Blaven and the Black Cuillins ; or the pinnacles and cliffs of the lava flows of the spine of Trotternish ; or again the rounded relief of the Red Cuillins, an acid intrusion not weakened by less resistant intrusive dykes as are the Black Cuillins.

Climate in its relation to population.—The climate is one of mild winters and cool summers, with well-distributed rainfall. Comparison of the Ordnance Survey rainfall map and the population map shows

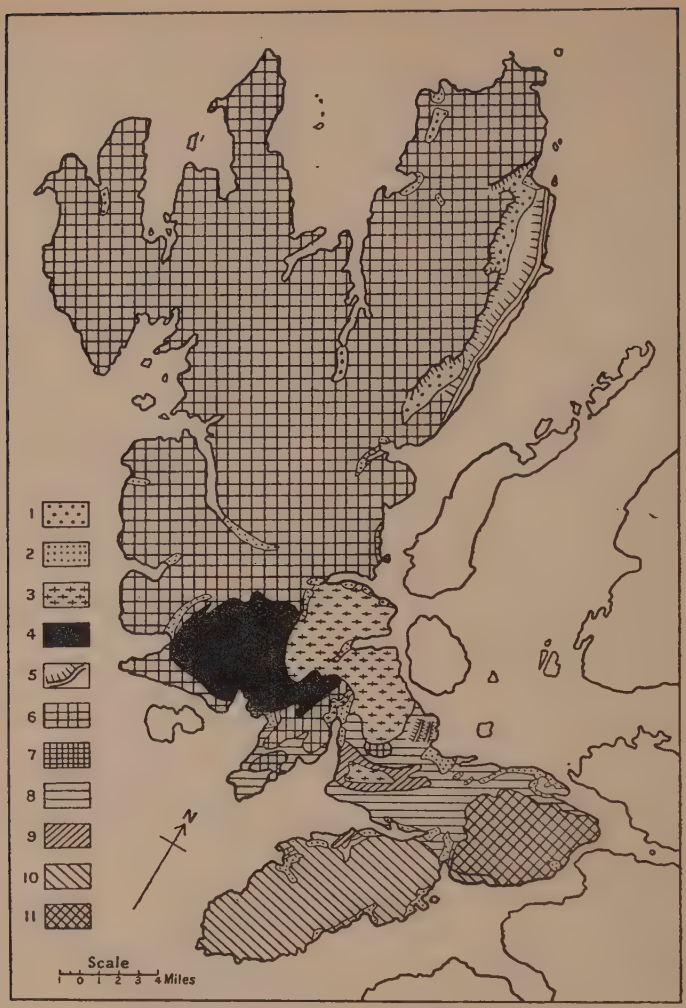


Fig. 2. Skye. Landforms.

1. *Plains*—lake-beds, etc.; valleys in Trotternish, apparently subsequent, in glacially altered Jurassic sediments, controlled in transverse section by sills underlying and to the east.

2. *Raised beaches* and related terraces.

3. *Tertiary acid intrusion* of the Red Cuillins, peneplaned, uplifted to 2000-3000 ft., maturely dissected, then altered by glaciation; also an outlier of over 800 ft. in the South Central Lowland.

4. *Tertiary gabbro intrusion* of the Black Cuillins, peneplaned, uplifted to over 3000 ft. and dissected; little of the 3000 ft. surface has been left.

5. *Sill scarps* of Tertiary intrusions, many now being regarded as lava flows.

6. *Tertiary basalt lava flows*—plateau basalts—faulted, peneplaned and uplifted, erosion surfaces possibly at 2000 ft., 500-750 ft., perhaps with a halt at about 1000 ft.; with columnar jointing, and readily weathering.

7. *Kilchrist vent*, a slightly rugged feature, under 1000 ft., revealed by erosion.

that a rainfall of over 70″ discourages settlement and agriculture, even if low ground is available. The very few settlements in areas with over 80″ are seldom prosperous, although some are densely populated. For instance, Sconser on the central east coast has a very dense population which it maintained with difficulty until recent years when the township was markedly improved. In contrast, Glenmore and Mugeary, despite a high wet inland position, have now a very small but prosperous population. As the rainfall increases towards the hills or in their lee, cloudiness increases, there is less sunshine, and on the high ground snow, insignificant at normal habitation levels in most years, lies much longer.

The prevailing winds and the most frequent gales are from SW, and the human response is to take advantage of such shelter as is offered by valleys adjusted to the important structural trend NNW-SSE. In the most exposed situations, the houses tend to be sited with the gable end or a corner to the SW, and the door away from the wind. The houses are on sheltered banks or in hollows, and a porch and double door are regarded as desirable luxuries.

The direct effects of climate on the population include a reputation for general good health marred by colds, chest troubles, and rheumatism. The relaxing climate may help to explain why the Skyeman appears to be more vigorous abroad than at home.

Climate affects certain agricultural operations : three out of four days are wet in most hay seasons, and when the turnips should be weeded in July, and similarly through the long-drawn harvest season. Constant exposure to bad weather is the lot of the crofter on the hill out after his few beasts, and of his wife in her journeys for water and other tasks, on most days in winter and many days in summer. This may also be one of the many factors contributing to depopulation.

Climate affects tourism : the favourite months of June to September are often wet, and the hours of sunshine daily fall from six in June to four in September on the low ground, with less on the hills. The high humidities during the holiday season are generally felt to be

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8. *South Central Lowland :* Torridonian, Cambrian, and Secondary sedimentary rocks, in a complex down-faulted and synclinal area ; perhaps peneplaned and uplifted to under 500 ft., with residual heights to 900 ft., and youthfully dissected.

9. *Limestone and marble* within the South Central Lowland, and surrounding one acid intrusion sketched—there are others of less importance.

10. *Erosion surface* covering much of S Sleat, at 500-1000 ft., with large areas at about 750 ft., cutting across Torridonian sandstone, Moine schists, altered Lewisian gneiss, and Cambrian limestone and quartzite ; dissection is youthful, with some plucking and gouging by mainland ice.

11. *Erosion surface* in NE Sleat, of 1500-2000 ft., Torridonian sandstone maturely dissected, then ice-scoured into rounded hills with many minor cornices.

Dykes, too numerous to be indicated on this scale, control major and minor valleys ; they tend to be radial round the Black Cuillins, and elsewhere their trend is NNW-SSE. Another trend, not notably associated with dykes, is WSW-ENE, both trends giving the main lines of the valleys and, indeed, of the isle itself.

Based upon the Ordnance Survey map, with the sanction of the Controller of H.M. Stationery Office.

relaxing. Also, dull, warm, humid days favour the midges, which torment the holiday-maker as well as the haymaker or harvester.

Among the favourable factors are the length of daylight when sunshine does come, and the great beauty of colour, with blue of sea and sky seeming to extend, in this humid climate, to lend a shimmering

Fig. 3. Skye. Old cultivation ridges, mapped from air photographs (air cover is not quite complete). 400 ft. contour is shown. Based upon the Ordnance Survey map, with the sanction of the Controller of H.M. Stationery Office.

blue softness to the harshness of the Cuillins' form and colours, and blending with the green of most foregrounds.

Soils in relation to population.—Over about a thousand feet, there are generally ice-scoured rock, screes on steep facets, or poor skeletal soils. Below that height, the soils vary broadly with the underlying rocks,

although morainic soils may import foreign elements. The arable soils are generally light—a favourable factor in the wet climate—but tend to be acid. At low altitudes, there is a tendency towards water-logging and formation of hard pan in level areas even of apparently good natural drainage ; and at higher altitudes peat tends to form even on slopes.

The population is very strikingly concentrated in ' sweet Skye ' as the northern basaltic half of the island was called by one of the field workers of the West Highland Survey. Here the soils, derived from basalt bedrock or moraine, are better, and rich in potash, though still leached and acid. This area lies roughly north of a line from Sligachan to Loch Eynort. The people are less tied to the raised beaches, which are nevertheless appreciated. The lowlands of the ' waist ' between Broadford and Lochs Slapin and Eishort are very peaty, and the population is very peripheral in distribution. For instance, Breakish on the east coast and Torrin on Loch Slapin are both on raised beaches ; the latter has also the advantage that some of its grazing is on limestone soils, which markedly affect the flora. In Sleat there is great dependence on the raised beaches in the areas of Moine schists and altered Lewisian. There are exceptions on the SE-facing slopes of Sleat, between Aird of Sleat and Knock : townships and arable are on steep slopes possibly with thin morainic soils, and small patches of raised beach. The high, maturely dissected and ice-scoured erosion surface of Torridonian sandstone in N Sleat is avoided by settlements, which are hemmed in, with their arable, on the light and well-drained, though stony, soils of the raised beaches.

The river terraces related in age to the raised beaches are not much used for settlement and agriculture, apparently because they are too coarse and stony.

Grouped settlements are often associated with the silts of a few recent or artificially drained lake-beds. The Kilmuir area on the west of Trotternish was long partly dependent on the silts of an artificially drained loch—and may be again in future. Glendale, in the NW peninsula of Duirinish, uses much of a recent lake-bed, apparently naturally drained for the most part, but subject to flooding. Skeabost farm, NW of Portree, makes excellent use of silts possibly on a former lake-bed, but the population affected is very small. In the Portnalong area, in the N of Mingnish, is a river flat, possibly once a lake, which is very little used, and might offer possibilities.

Vegetation in relation to population.—The small extent of woodland may be judged from the Ordnance Survey maps on the scale of 1 : 63,360 or 1 : 253,440. There are small residual areas of the natural birch-hazel association which appears to have been the climax vegetation of much of the island, except for surfaces over 1000 feet, or 2000 feet in favoured areas. On the basalt lavas, there are residual patches of pure hazel, which Darling has suggestively likened to a kind of *maquis*. The Torridonian area of Sleat has some residual oak woods, which are also and exceptionally well seen in the steep glen of Tarskavaig, cut youthfully into schists. There are also small areas of trees planted for amenity, shelter or timber on big estates, and one area

planted by the Forestry Commission between Lochs Brittle and Eynort, on slopes under 1000 feet, and avoiding the exposed slopes facing west.

For the rest, Skye is a grassland, wherever there is not bare rock. Coarser grasses and sedges grow on the wetter and higher facets, and the great areas of peat bogs have little good grazing. Somewhat better grasses and a little heather grow on lower and drier surfaces. Much of this vegetation has been the result of changes due to human activities: man has felled and burned the vital taller elements in the former climax vegetation; his animals have prevented their regeneration, and moreover have altered the constituent plants in the herbage, by the selective grazing and lack of trampling power of sheep especially. Burning, now of rough grazings, is important. Bracken is increasing on the well-drained slopes of the better pastures of sheep-farms and all but a few stable old crofting areas. The phases in these changes are doubtless parallel to those described by Darling with reference to the Highlands and Islands as a whole.[6]

Landforms, climate, soils and vegetation, along with the traditions of the people, have kept the way of life mainly a pastoral one. The secular deterioration of pastures, however, constantly tends to reduce the number of people that can comfortably be maintained by stock-rearing, and this is one more factor responsible for depopulation.

Modes of life related to population densities.—In considering the distribution patterns and densities of groups of people using the partly altered physical environment, there have to be considered two widely differing systems, crofting and hill-sheep farming, both using the best of the low tillable soil as arable mainly for winter feed for stock, and the higher surfaces as hill pasture for sheep and cattle. About 2500 'crofters' and their families (about 7500 in all) occupy about 30 square miles of inbye land and 540 square miles of rough pasture—inbye land is land mostly improved, and enclosed for at least part of the year. A total of about 500 farmers, farm and domestic servants, and their families, occupy about 4 square miles of arable land and about 100 square miles of rough pastures.

The 'crofter' has a small patch of 2 to 25 acres, of individually cultivated arable land on the low ground, originally judged equal in production to that of his neighbours in the same township. The arable strips are usually open in winter to the stock of the whole township, which discourages improvements, e.g. by reseeding. The 'crofter' has also a share—his souming—of cattle and often sheep and horses in the common grazing, almost invariably rough pasture on the higher surfaces.

The arable land is used to produce hay and oats as winter feed for the cattle and a few potatoes for the family. The cow is wintered in the byre when necessary, and feeds on the common grazing in summer, when the milking is often carried out on the hillside. The bullocks are kept on the common grazing in summer, and on the arable or the nearby hill in winter, and fed as necessary with hay or oats in the sheaf. This routine is permitted by the mild temperatures, and imposed by the lack of steading accommodation. The sheep may be owned individually, or collectively as a 'club stock' under a whole-

time or part-time shepherd, who is usually a croft-holder in the township. There is always some collective labour in handling the sheep. Sheep management is similar to that on the sheep farms but is generally less efficient.

Each house is on its croft, so that what may be called a 'community' of a number of townships may stretch for several miles. The significance of this pattern will be discussed in Part II. The crofting townships show remarkable variations in the density of population in relation to the area of inbye land (Fig. 4).

The older crofting townships existing to-day were set up by or at the instance of the landlords for reasons political, military and economic. The fixation of the crofts, with each house on its own arable strip, displaced the ancient runrig system, where groups of co-workers with equal shares had their homes close together, and the rigs were balloted for annually. This phase of fixation was accompanied by the intervention of 'tacksmen,' large farmers of rent as well as agriculturists, and may well have been the beginning of overcrowding especially into coastal areas. Clearances for sheep, and later for deer forests, followed in the nineteenth century, causing very striking cases of underpopulation, which may be sampled by comparing Figs. 3 and 4; these anomalies are evident in certain coastal areas, but also in some interior glens, e.g. Gleann Meadhonach, not far from the southern tip of the island. Cases of overpopulation still exist, which originally arose from the crowding of the people into tiny holdings on the coasts. Having been deprived of the shielings on the hills, these folk were able to survive only because of the potato, the temporary prosperity of the kelp-burning industry, and by fishing, which also is not significant now.

Fig. 4 relates population to the area of 'inbye land,' which is the primary factor in determining the souming on which the crofter's position depends. 'Inbye land' is the area of strips of land, including the crofter's arable strip, some other land usually improved or used for arable purposes in rotation, and often some rocky or marshy ground as well. It corresponds with the land within the head-dyke of Stevens' paper.[7] A very dense population, in this area, usually means poverty and overcrowding following the clearances. The townships of 'dense' and 'moderate' population are usually the result of resettlement from congested districts after the civil disturbances of 1882 caused by the clearances; or, in the period after 1918, in resettlement of ex-servicemen. Portnalong, however, was settled 'very densely,' as the immigrant Lewis and Harris families were accustomed to supplement 'crofting' by fishing and weaving. These resettlement areas are nearly all in the north of the island (Fig. 4), i.e. on the better soils associated with the plateau basalts, on land now owned by the Department of Agriculture (Fig. 5).

Overcrowded townships in isolated, especially peninsular sites, tend to lose population, and the remaining tenants usually take over the vacant 'crofts.' Given good fortune in the new tenants, or a wise landlord in choosing them, this can lead to a kind of rationalisation, in which the 'crofts' assume a more economic size, as in some of the originally fishing townships, and notably in the high inland

Fig. 4. Skye. Population densities, from number of occupied houses per square km of inbye land and 1931 census.

Crofting

	Occupied houses		Persons (approximately)	
	per sq. km	per sq. mile	per sq. km	per sq. mile
1. Moderate . .	6–14	15–35	25–54	55–139
2. Dense . . .	15–24	36–60	55–89	140–229

townships of Glenmore and Mugeary. More often, however, the result is under-use of arable and even hill land, owing to neglect of the land by absentee 'crofters,' or by old folks not able to undertake arduous work. These are the 'absentee and decrepit' crofters of later references. Glendale and Elgol are two peninsular areas not so subject to deterioration, for reasons to be noted later.

If an overcrowded township, however, is on a good and busy main road, and giving access to jobs in hotels, on piers, roadworks, 'buses, lorries and so on, then it may continue to be quite densely populated by families who seem prosperous enough, as, for instance, the townships east of Broadford. The land may be neglected in these cases, if the only able-bodied folk are too busy to work it; or else the fact that money is available may result in a good standard of husbandry by a member of the family devoting at least part of his time to the croft.

The houses vary with the tastes and prosperity of the 'crofters,' from thatched 'black houses' only slightly improved, through cemented stone houses with corrugated iron roofs, to the prosperous, usually whitewashed house, with harled walls and felt roofing, of uniform but quite pleasant pattern, introduced and subsidised by the Department of Health. Very few houses have water laid on, and this alone prevents tenants from catering for tourists, although many have relations from the city to visit them in the summer.

Hill Sheep Farming.—These farms show as areas of population density indicated as 'moderate' in Fig. 4. The areas are nevertheless underpopulated, considering the amount of good arable and hill land which they occupy. The farms have been tending to decline in prosperity, to have deteriorating pastures overgrown with bracken, but remain well capitalised and efficient units within their limits of the farmers' tradition and prejudices—as the prejudice against forestry, not altogether unjustified by early plantings.

3. Very dense . .	25–69	61–174	90–269	230–659
4. Exceptionally dense.	70–128	175–320	270–460	660–1150

Non-Crofting

5. Farms and estates. Some have very little inbye land, but most approximate to 'moderate' density as defined above, if mansions, farms and domestic servants' houses are included.

6. Knots of non-crofting population. The number of occupied houses is given first, then the number of people, e.g., 137–802.

LF=Lobster fishing.
SF=Salmon fishing.
T=Tourism.
-----=400 ft. contour.

In the text, the 'dense' areas are taken as normal, 'very dense' and 'exceptionally dense' as positive anomalies, and the 'moderate' and 'farm and estate' densities as negative anomalies.

Based upon the Ordnance Survey map, with the sanction of the Controller of H.M. Stationery Office.

Sheep farms show a use of environment not far different from that of a crofting community, but scale, emphasis and standard of material life are very different. The arable on the low ground is used to produce winter feed for the rams, cows, and at least "enough bullocks to keep the hill ground trampled," as one sheep farmer put it. They have a

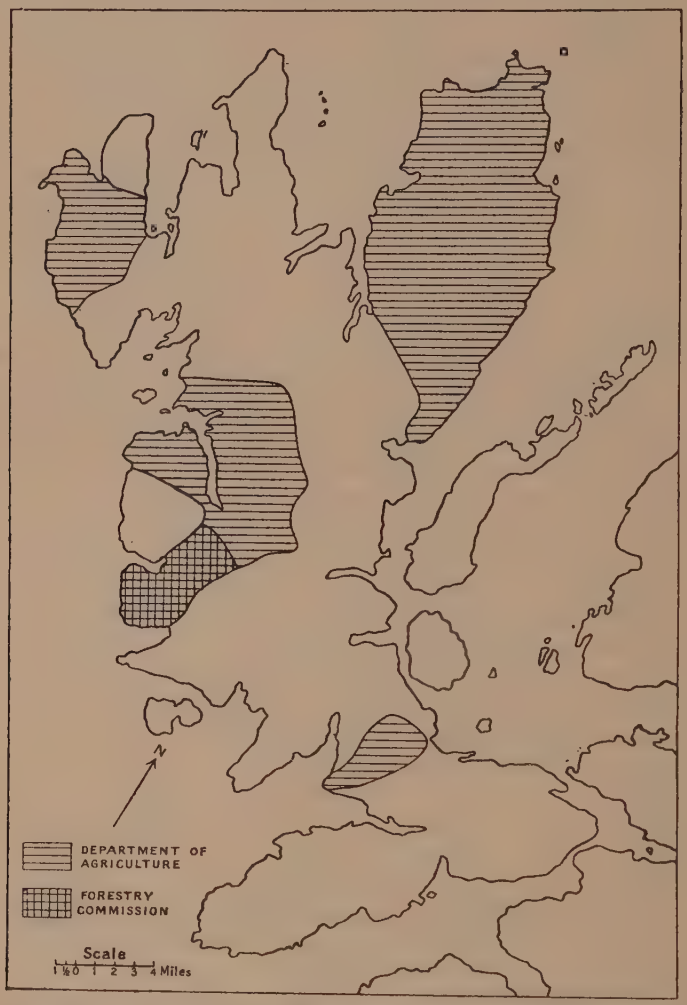

Fig. 5. Skye. Land owned by the Department of Agriculture : horizontal shading. Forestry Commission : cross-shading. Based upon the Ordnance Survey map, with the sanction of the Controller of H.M. Stationery Office.

proper steading, so that at least some bullocks can be wintered in, and the arable gets the benefit of the dung, often along with a more liberal use of seaware for composting than is now found in crofting areas. The hill pastures are more likely to have a full-time shepherd, and if he is efficient, the daily driving of the sheep will make the best use of coarse high grazing at night, and good low pasture early in the day. There may be, too, more careful management of good low

pastures for winter feed for the ewes, possibly also for the hoggs, which otherwise must be wintered in the fat lands of the east, round the Moray Firth. There is much more mechanisation—shearing machines, tractors, etc.

The farmer has a very much higher standard of living, sometimes reminiscent of the aspirations of the tacksman. The unit of farmer and shepherd, and possibly farm hand, with their families, is often isolated —still more so the hirsel, the charge of one shepherd—often far in the hills and sometimes inaccessible by road.

Groups of sheep farms when placed within a reasonable working distance, perhaps ten miles given good roads, co-operate at busy seasons. If there are crofting townships near by, the sheep farmers are normally on reasonably good terms with their neighbours in the township, from whom they may draw whole-time labour, the worker living at home. The crofters may work seasonally on the farm at busy times.

The lack of dairy farms is very striking—there are only one or two active dairy farms equipped on a scale adequate for the sale of milk, and milk is actually imported to the island from the Moray Firth lowlands, even to supply the school in Portree. Activities on the existing dairy farms tend to be restricted to what can be done by the family. For the rest, there is lack of capital, and perhaps of the peculiar individual qualities that help to make dairying a success. On the ' crofts,' there is much milk at some seasons, shortage at others.

Fishing influences population rather by inertia, for less than a third of the holdings in former fishing townships may be held by active ' crofter '-fishermen.[8]

The possibilities of inshore fishing are believed by many local people to have diminished because of poaching by trawlers within the three-mile limit, and because of seine netting, which some firmly believe destroys spawn ' anchored ' to the sea bottom. It is more likely, however, that fishing generally has declined owing to Skye's position, and the scattered nature of her fishing ports ; and that her trade has gone to ports working on a bigger scale, like Stornoway, or better placed for marketing, like the railheads of Kyle and Mallaig.

A few Irish-built lobster boats work from some of the old fishing townships (LF in Fig. 4). The great difficulty of this now booming trade is to get the lobsters to Billingsgate alive, after their long journey by road, ferry, and rail. There has been some Government talk of lobster pools in which to store them until the actual time of dispatch, but no action.

One fine new boat has recently been built—in Macduff—for a crew of young Portree men on their release from the Navy. They follow the herring as full-time fishermen—i.e. they do not fish to Portree—and are a kind of vestige of what was once a trade important in the island's economy prior to the civil disturbances of 1882.

The rest of the 40 men engaged in full-time fishing, at least in summer, are employed by a Perth firm which rents the salmon netting rights from the landlords (SF in Fig. 4).

Boat-building has greatly declined in a generation in the Portree area. There is one boat-builder left—at Penifiler across the loch from

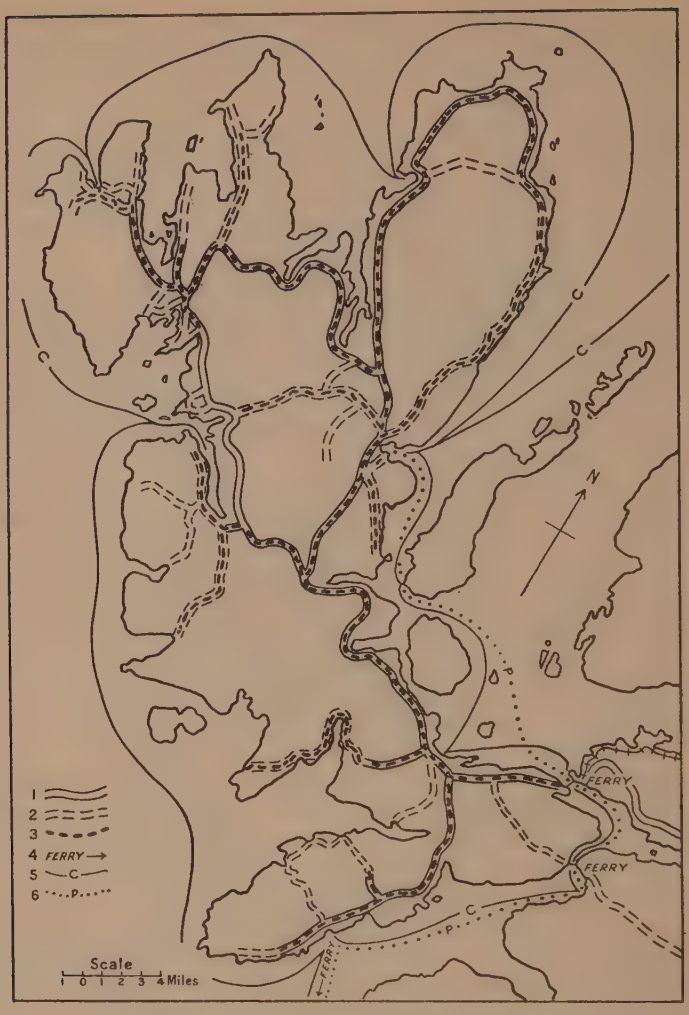

Fig. 6. Skye. Communications.

1. Good roads—usually narrow, 7-14 ft., and unfenced, but good surface ; some bad hills ; passing places necessary in parts.

2. Medium and bad roads—rough, untarred surface, with numerous pot-holes ; at worst, loose rubble, of rounded pebbles near shore, elsewhere usually of angular basalt ; causing heavy wear and tear : bad for motors and dangerous for cyclists.

3. 'Bus services—normally to Portree for the morning boat to Kyle of Lochalsh and Mallaig, returning in the evening after the boat arrives back at Portree.

4. Ferries—as required.

5. Cargo steamer—about thrice fortnightly.

6. Passenger steamer—daily.

Based upon the Ordnance Survey map, with the sanction of the Controller of H.M. Stationery Office.

Portree. He is kept busy with repairs, and now makes chiefly small craft—dinghies and a little larger.

Weaving is carried on in the homes in the settlements of Lewismen and Harrismen in the Portnalong area with perhaps 60 looms; on workshop scale at the Highland Home Industries handloom factory at Kilmuir on the west of Trotternish with about 20 employees and aiming at training some workers to carry on in their homes; and spinning and weaving in Portree in a small but highly mechanised factory with 25 employees.

Forestry.—In the Loch Brittle-Loch Eynort area recent planting by the Forestry Commission is on valley slopes under about 1000 feet, and, as already noted, avoids the windswept west-facing slopes. The forests are having a slight but significant effect on population by tending to stabilise these two isolated westerly settlements, in a situation "at the end of the road" where otherwise there would surely be marked depopulation.

Minerals scarcely affect population distribution at present. The new quartzite quarry at Ord is in an isolated and sparsely populated sheep-farming glen, in the W of Sleat, so that its few labourers must come from a distance over bad roads. The diatomite diggings at Loch Cuithir in east central Trotternish have so far employed up to 25 labourers. There may already have been some stabilising effect on neighbouring townships, and the industry may possibly become more important.

Distilling.—The 'Talisker' distillery—actually at Carbost on the south shore of Loch Harport—employs about 40 men, and there is a little settlement of a dozen company-owned houses, mostly in a corrugated iron row. It also helps the population of surrounding townships by affording employment, and perhaps more distantly by improving the condition and price of their cattle by providing good, cheap fodder from the draff. Peaty water and, probably more important, ample labour are available, but coal and grain are imported by sea to an adjacent pier.

Tourism affects population density chiefly by adding to the livelihood of the people in the non-crofting settlements at Portree, Broadford, Kyleakin and Armadale, and by stabilising the dense crofting population in the Dunvegan townships owing to the proximity of the famous Castle. Yachting brings business to marine stores and shops in several of the harbours, and cruising liners to 'bus and car hirers in Portree and Broadford.

Sporting tenants are also still of some importance. They fish for salmon and sea and loch trout, and shoot grouse and deer. There is now little restriction of other land-use by owners of deer forests.

Internal communications.—The distribution and condition of roads, and the 'bus routes, affect markedly both the numbers and the well-being of the population (Fig. 6). The routes are mainly on the low shoreward ground and serving its population. Inland routes are through the glens and valleys, often following the main trend lines. About half the roads have a bad surface, which adds to running costs: 'bus fares and carriers' rates are expensive. It is worth noting the

tendency for many townships to support a small carrier's business, run by a part-time crofter to carry coal, peats, etc. and even cart hay.

It is generally the peninsular settlement not on a good road or a 'bus route which suffers more loss of people and vigour—the place "at the end of the road" contrasting with townships on a circular through route as in Trotternish. And, of course, a 'bus route to a dwindling community is not economic. The distances of peripheral areas from Portree—30 to 50 miles—are still a considerable barrier.

External communications.—Ferries and shipping routes (Fig. 6)—passenger and cargo—link the island with Glasgow, or with the rail-heads of Kyle and Mallaig. The cargo is mainly a one-way traffic of coal, ironmongery, and all kinds of supplies, including much food. Cargo steamers ply about thrice fortnightly. The rail and passenger steamer and ferries give a two-way traffic. The island's £100,000 a year of agricultural produce—nearly all cattle, sheep, and wool—is marketed usually at Dingwall and Inverness ; there are also seasonal markets for bullocks at several points throughout the island. People, too, are attracted by the regular pay and fixed hours, town houses and amenities of the industrial area of the south. Men go off to sail the seven seas from the great industrial ports. Inward traffic is of Skyemen returning for summer work on the croft, or on retirement, and many thousands of summer visitors and tourists.

Air travel has by-passed Skye. Even to be deprived of the services of the ambulance plane is an uncomfortable feeling in an island so remote from the nearest first-rate hospital in Inverness. Landings have been made by the ambulance plane at Glen Brittle west of the Black Cuillins—at the end of an appalling road. Nationalised undertakings show no sign of developing services using small flying boats to serve such areas. It is this kind of issue which rouses some local feeling that the island is a real entity, requiring separate representation in Parliament, instead of being included in the far-flung constituency of Inverness-shire.

Other public utilities.—Only Portree, Broadford, and Kyleakin have piped water supply on a large scale. A good supply of water to crofting houses is felt as the priority need. Piped water was laid on at Kilmuir, using Government aid, and mostly crofting labour. Very few taps still function, even in this relatively vigorous community. This can be blamed on the crofters' neglect of normal maintenance, and the experiment regarded as a failure. The crofters, on the other hand, say that the damage resulted from exceptional frosts, and claim that the authorities should repair the damage, which they say is beyond their resources. There is no tradition of using water barrels, and the heavy work of fetching water from springs, wells, and streams has always fallen to the women. There is a water scheme for Skye, but if it is not implemented soon, this will continue to be a factor in de-population. Dr. Darling has said, however, that a house in such a wet area could and even should be self-sufficient in water by running the roof-water into cement-lined tanks dug into the ground.

Hydro-electricity has begun to appear in the south of the island from the Nostie Bridge power station of the Lochalsh scheme on the

mainland. Work is to be begun soon on the scheme for northern Skye, at the Storr Lochs N of Portree. It is generally welcomed, but has hardly had time to affect the population. Portree at present has electricity generated by diesel engine at one of the hotels.

II

A Synthetic Account of the Population Density

The Broad Pattern

The broad pattern is one of mainly peripheral settlement of rather isolated clusters of humanity, each on its own patch of arable land (Fig. 4), but depending very largely on the intervening rough pasture, and peat bogs for fuel, stretching into the hills, especially on surfaces below 1000 feet.

In Sleat and the lowlands between Lochs Slapin and Eishort and Broadford Bay, are loosely linear groups of houses along lines mainly WSW-ENE or SW-NE. The lightly populated areas are sheep farms and estates. The ' moderate ' patches include the recent but not too prosperous Department of Agriculture settlements of Coire Chatachan-Kilbride-Suisnish—across the low ' waist ' SW of Broadford. There is one township of moderate density in a typical isolated peninsular site : Glasnakill, near the point of Strathaird, south of Blaven. Densely populated settlements are mainly well-doing but isolated, depopulating and rather depressed townships on raised beaches and terraces round Tarskavaig, W Sleat. These have a little lobster and domestic fishing. Achnacloich and Tarskavaig are ' very densely ' populated, and roads are extremely bad, but they seem prosperous. Land-use appears to be as good as any in the crofting area.

Gleann Meadhonach, to the south of these, is an interesting example of underpopulation, as there is evidence of ancient cultivation.

The majority of the townships of this area of poor soils and private landlordism are very densely populated. Those on the steep southern shores of Sleat near Armadale benefit from the main road and 'bus route, and still more so the townships on raised beaches and Secondary sandstone scarps east of Broadford. These townships have lost something of the old-world character found in Tarskavaig, and lost, too, their fishing activities, but have gained a certain prosperity by employment at Broadford and Kyle, and a rather shamefaced development of the tourist industry — the adjective ' shamefaced ' is perhaps justifiable in view of the improvised and unimpressive notices by the roadside, and because the practice of taking money from the traveller may be looked down on by neighbours as unworthy of Highland hospitality. Roadside townships of this type contrast with the moribund condition of Kylerhea, sited on an isolated raised beach, and hemmed in by sheep farms to north and south ; its people are mostly aged, and it shows few signs of the recovery and rationalisation occurring after depopulation in some townships. Its position on a through road and an ancient ferry is not of much help, for the road on Skye

and on the mainland has an atrocious surface and very severe gradients.

The Red and Black Cuillins alike are not populated, except in so far as tourists and climbers are attracted, who help to support the non-crofting population of a few hotels near by and in the nodal and ferry points of Broadford, Kyleakin, and Armadale.

On the eastern shores of the Red Cuillins are a number of extremely densely populated townships, crowded on to narrow raised beaches on loch sides, avoiding the loch heads. They exist precariously by means which appear to include exceeding their souming for the common grazing, and driving flocks on to Lord MacDonald's deer forest. The lower hill and their tiny patches of arable seem to support the stock in winter. Little benefit seems to be derived from the main road, in the absence of water, sanitation, and good houses in which to cater for tourists. Examples are the townships at Luib and Sconser, and their juxtaposition to the good low pastures of Sconser Lodge, on an alluvial fan, and to the deer forests, shows the legacy of the clearances.

To the north of this begins the great stretch of plateau basalts of 'sweet Skye.' It is little known to most casual visitors, but has the spectacular line of cliffs which I have called the spine of Trotternish (Fig. 2), and is much more densely peopled than the great tourist areas of the Cuillins.

At the foot of the Black Cuillins, but already in the basalt country, lies Glen Brittle. There are an hotel for climbers and a youth hostel, a farm, and two densely peopled little townships on the margin of the raised beach. The visitors enable a local 'bus service to be run to Sligachan and on some days to Portree. The population is tending to be stabilised by the Forestry Commission plantings, as is that of Loch Eynort—a moderately peopled, isolated township on a similar site near the head of the loch. On a similar site again, to the north, Talisker supports at a much higher standard of living the few inhabitants of a mansion and a very hard-working sheep-farming family, with the aid of several square miles of well-managed hill pasture.

The whole area to the north of a line Sligachan-Talisker has its population arranged in a striking pattern largely following the structural SSE-NNW trend, on glen side and shoreward slope.

Non-crofting settlements of sheep farm and big house are examples of negative anomalies. The very densely peopled areas shown may represent conditions of poverty, but certain alleviating factors are present. On the raised beaches and lava terraces of the Staffin area, in the NE of Trotternish, many of the homes are maintained by merchant seamen, and the small crofts are well suited to their needs. Round Uig Bay, on the west coast of Trotternish, there are very densely peopled townships on raised beaches transecting Jurassic sediments. Here live a number of widows, merchant seamen, and old folk maintained by pensions and by contributions from families in the towns who hope to retire to Uig. There is some catering for tourists on this lovely sheltered bay, renowned for its sunsets. There is a little lobster fishing, the remnant of former activity in herring and white fishing.

The very dense and vigorous population of Glendale in the NW of

Duirinish forms a relatively well-off community, although not without some unsatisfactory features in its social and economic life. The loch and glen are relatively sheltered from the SW gales, much of the cultivated slopes have a good southerly exposure, but are broken by lava flow outcrops ; there is some good level land on a recent lake-bed, unfortunately still subject to flooding. For the past fifty years, the people have had complete control of the estates, including several square miles of good hill land, which they have been buying by instalments and which will soon be their own property. This experiment has not been without its dangers, but it no doubt partly explains the relative prosperity of the glen. The choice of Glendale for the experiment is doubtless traceable to the vigour of the people, or rather of their ancestors, who were prominent in the Rising of 1882.

The relative overpopulation of the Portnalong area is due to its deliberate close settlement in 1923 by families from Lewis and Harris. There is only domestic fishing, but the community is busy and prosperous from the hand weaving of tweeds, and the uniform and selected age-group makes it an unusually vigorous community. The small patches of nearly level but well-drained soil above lava cliffs, or by shore or glenside, are very well cultivated.

Dunvegan, on the ' waist ' east of Duirinish, is an area of very densely populated townships adjacent to the sparsely peopled MacLeod estate policies and farms. Social life is vigorous because of the maternal interest of Flora Mrs. MacLeod of MacLeod, and the people earn money from tourists coming to see the famous castle.

The townships classed as densely populated may be due to depopulation of areas formerly overcrowded, such as the erstwhile fishing townships of Borneskitaig and Hungladder in the NW of Trotternish. These still have a few lobster boats fishing. There has been some consolidation of holdings towards an economic size, and the rest of the people exist on pensions, when their land is often neglected ; or one of the family may work at the Highland Home Industries factory near by at Kilmuir, or keep a shop, etc. Some of these densely populated townships represent early attempts at rational resettlement, such as Borve and others on the broad slopes of the ' waist ' between Portree and Loch Snizort ; the holdings are still too small, and have to be supplemented by similar means.

The townships shown as moderately populated may be due to the rationalisation of the holdings in a depopulating area, as the high but sheltered (NNW-SSE) and fertile glen of Glenmore and Mugeary, SW of Portree. Its units are now satisfactory economically, although not perhaps socially, for the glen is isolated. The isolated peninsular area of Vaternish may be somewhat comparable. The moderately peopled townships of Kilmuir, in W Trotternish, are in an area of resettlement on very good-sized crofts, having a relatively low rainfall of about 50″, and some shelter from SW gales behind the lava scarp to the west. It was long famous for its cereals, almost the granary of Skye. The break in tradition, however, has been so complete that it is difficult now to turn the people's minds from cattle-rearing towards a better utilisation of their potentially valuable drained lake-bed.

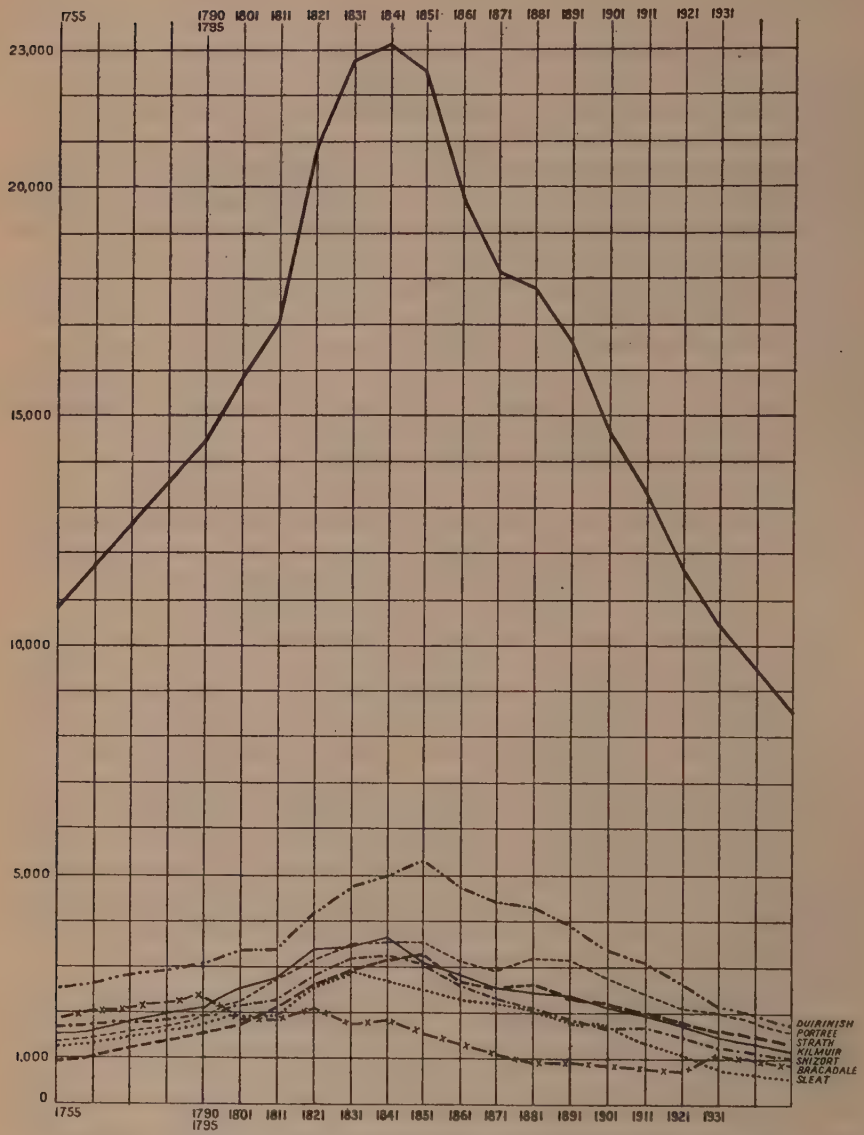

Fig. 7. Population of Skye, 1755-1947. Figures for 1755 and 1790-1795 from the Old Statistical Account.

ISLE ORNSAY AND SOUND OF SLEAT

Settlement, once of crofter-fishermen ; raised beach and low ice-scoured schistose hills ; tourism now important ; near good road ; fine views of Kintail

PORTREE

From above pier used by mail-boat ; few fishing boats ; shopping and administrative centre ; settlement spreading from raised beaches to lava slopes

TARSKAVAIG

oking from
istose Sleat to
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The houses are good on these larger holdings. Even here, however, family income has to be supplemented from other sources, including the workshops of Highland Home Industries Ltd. It is significant that even in vigorous communities like Glendale and Kilmuir the tendency to depopulation is strong. There are moderately populated townships also in the recently settled areas of Bracadale in the west. Close by, south of Loch Bracadale, lie others, very densely populated and decrepit, a legacy of the clearances. The township of Sheadar in Glen Uig, moderately peopled, and owned by the Department of Agriculture, is causing concern because of its absentee and aged ' croft ' holders.

East and south of these Bracadale townships, the post-1918 re-settlement by the Department of Agriculture was in the form of what may be called hirsel-crofts. These gain the benefits of the Crofters Acts, but are completely self-contained units as to land tenure, without communal elements like participation in a common grazing, and of about the size of a hirsel on a large sheep farm. They are satisfactory units economically, but some are rather isolated.

The Pattern in Detail

The outstanding feature of the crofting pattern is its loosely strung character, with each house on its own croft. Several townships are grouped to form what may be called a community, and this may stretch for one to three serpentine miles along glen or shore, as Glendale or Kilmuir. Former economic and social relations have not been maintained between the smaller township groups which used to work co-operatively, and the larger groups, often owing common loyalty to a clan chief. These long settlements are now little united or bound only by interest in the church, shop, or post office. It should perhaps be noted that if there is more than one church, the community will tend to be split, for religious adherence tends to be narrow and almost fierce. Any other social activities, except a ceilidh among close neighbours, are discouraged by the distances to walk often in bad weather, as well as by ecclesiastical disapproval. Since the second world war, however, there are signs of awareness that social life and the depopulation problem are linked, and the social geography may change quite quickly.

The sheep farms are often isolated, but may have social and economic relations with other farms, and socially more distant relations with crofting townships.

The scattered hotels stand somewhat apart from the life of the island, but give employment in summer.

Of the more nucleated settlements, Portree alone has a ' town-village ' lay-out of the square—rivalled by the pier as a town-centre—and shopping centre, all on a tiny scale. Eight hundred to a thousand people live on two raised beaches of small area but great importance, and are beginning to spread uphill in council housing schemes. It has the makings of a good community, but one which fails to come together, probably because the four churches are the main social

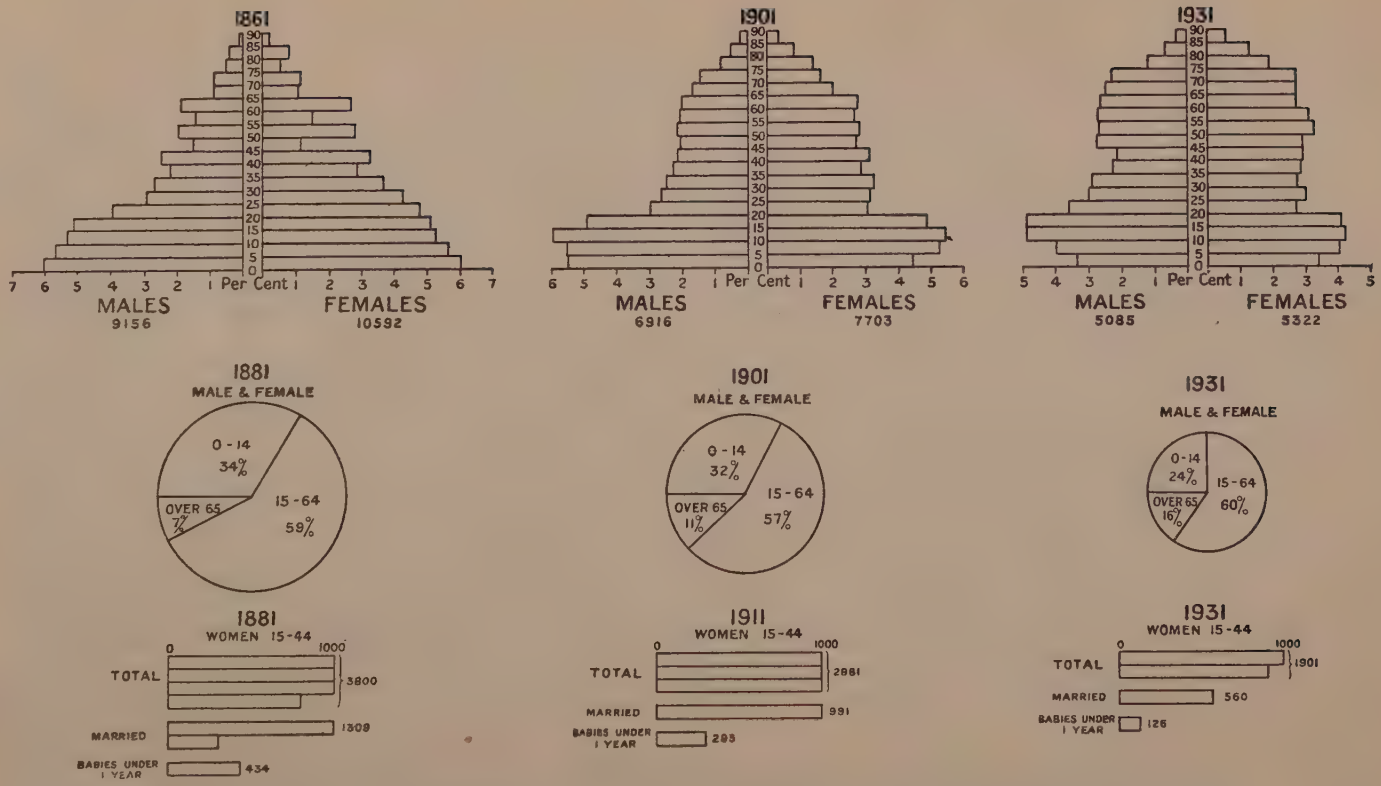


Fig. 8. Skye. Age-groups and fertility. Graphs drawn from information extracted from census reports, used by permission of the West Highland Survey.

gathering places, and pull different ways. It is the port, postal and shopping centre at least for the northern half of the island, the administrative centre in some respects for the whole island, and for some purposes, such as the boarding school for secondary education, its field extends across the Minch to Harris. Once a year at least it is the undisputed social centre of the island—on the day of the Portree Highland Games.

The non-crofting knots of Broadford, Kyleakin, and Armadale are former fishing settlements, all in their present form owing something to the intervention of a landlord in the early or middle nineteenth century, like Portree itself. They are street villages, on raised beaches at nodal or ferry points, quite distinct from a crofting township, with some shops and hotels, pavements, a school, and one or more churches.

Population Trends

The population trend before 1755 (Fig. 7) was no doubt one of alternate decline, caused by famine, and increase in a normally healthy and fertile people — A. Geddes' 'recurrent crisis' rather than 'stagnation'.[9]

The graphs show that despite the emigration which began in the late eighteenth century there was at first a phase of great and continuous increase. The causes were doubtless partly biological, partly political—the pacification of the Highlands, partly economic—the beginning of a cash economy and in particular the cattle trade, the import of cereals, and the introduction of the potato.

With the clearances of the early and mid-nineteenth century, emigration from the now seriously overcrowded coastal townships began to outpace natural increase. Kelp burning, then fishing, gave only temporary alleviation.[10, 11, 12] The famine period of 1846-1848 seems to have been the general turning point, although the parishes vary widely in this respect.

Since then there has been rapid and continuous decline throughout, with only minor halts. In the case of Portree parish, 1881-1891, the growth of the village probably accounts for the increase. The 1921-1931 increase in Bracadale was due to resettlement, but has now been succeeded by renewed decline. Barclay and Darling[13] point out that the estimated population of Skye in 1947 is only 65 per cent. of the 1911 total, that this would have been much less but for the increase in Bracadale, still 39 per cent. over 1911 despite its recent fall, and that Sleat is only 45 per cent. of 1911.

The age-group and fertility graphs (Fig. 8) show that the population is ageing and at more than the average rate for Britain. Associated with this there appears to be declining vigour, accentuated, it may be, by the fact that the ancient indigenous culture has long been under insidious attack by western industrialism.

Conclusion—The Future

Past trends are likely to continue unless something is done to halt them. An area which has given many fine men and women to the

world will become a green desert, and there will die a society of which these people are part, and which even now could send out ideas of value to the world at large.

The geographic potentialities can be fully realised only after proper co-ordinated survey of the area in relation to the outer world, perhaps by a team of workers. Much of the necessary material, however, is now available thanks to the West Highland Survey, and in the minds of the officials on the spot, such as those whose knowledge has contributed so much to the present essay.

The following economic and social considerations are merely outlined, as they are marginal to geography.

Water.—The need is already realised for a piped water supply for domestic and agricultural use—e.g. hot water for dairying and at calving time—and to allow for catering for tourists in the homes, not merely in hotels.

Hydro-electricity.—The hydro-electric schemes are already in hand, to raise the standard of material comfort, and give power for light industries which may be started. These plans should be implemented quickly, for the downward trends have already gone far.

Tourism.—Advertising of tourist facilities should be accompanied by certain other developments.

Market Gardening.—The climate and the best soils present an opportunity for market gardening. There is no market gardening tradition, for few crofts have even a kitchen garden, and experiments show that improved freight and market conditions are essential to successful development. The Department of Agriculture maintains a horticultural officer for the north-west Highlands, and hopes to establish soon a demonstration plot on one of the areas of fertile lake silts. Visitors could be supplied, and perhaps some vegetables canned.

Dairying.—Skye will probably never be a great dairy area, because of the human element, but the climate is favourable, and the local milk supplies could be increased to satisfy local demand all the year round, and to cater for tourists.

Fishing.—Domestic fishing should be encouraged, in the first instance, to give visitors good fresh local food—this in contrast with the present policy of the Fishery authorities which is concerned almost exclusively with large-scale operations. Small-scale canning and freezing might follow. Larger scale operations seem doomed to failure by the competition of mainland ports at railhead.

Roads.—The improvement of roads might well justify itself by the enlarged tourist traffic, lower maintenance cost, especially of 'buses, and general benefit to the community.

Land reclamation.—The lake beds already naturally and artificially drained have perhaps exhausted the major possibilities, and here the standard of the best tilled land might be made more general—cf. contrasts in land-use of adjacent areas of silts as seen at Kilmuir and Glendale. Small areas of saltings at the heads of sea-lochs might be improved.[14] In addition, lower, gentle slopes could be improved by draining and re-seeding, especially in morainic and basaltic soils—

as, for instance, recently on the big farm of Skeabost near the head of Loch Snizort, where hill-sheep farming may turn to hill-cattle farming as the supply of winter feed increases. A few areas of river silts might be improved, as projected by the Department of Agriculture at Coire Chatachan, and possibly at Portnalong. West of Kyleakin, about a square mile of raised beach, apparently blanketed by peat slowly flowing towards the sea, might offer possibilities.

Forestry.—The only existing modern forestry has resulted in some ' sterilisation ' of high pastures, but has given local benefits to the population. Land acquisition policy of the Forestry Commission (see Fig. 5) is now co-ordinated with that of the agricultural authorities, and co-ordinated plantings are planned for the adjacent island of Raasay. Future acquisitions should be correlated with agricultural development, small industries and forest parks, and particularly with the improvement of lower hillside, terrace, and alluvial flats as ' complementary pastures,' to compensate for the loss of hillsides to about 1000 feet.[10] Shelter-belt experiments should be begun soon, to improve stock and possibly cultivation, and give a supply of rough timber for fencing, etc.—an expensive but invaluable item in improving croft lands. Perhaps the natural birch, hazel, or willow need not be despised for this purpose.

Peat resources have already been surveyed, and an area in central Trotternish set aside for large-scale development in case of serious local unemployment. It has not been used so far because the unemployment incidence is heaviest in winter when peat working is usually impossible.

Other industries may be introduced or expanded. Woollens of the present-type have a very limited luxury market, and there seems nothing to be gained by competing with better situated southern mills in cheaper markets. Handwork to produce quality goods of tourist appeal may offer some possibilities, possibly using local wood as afforestation proceeds. Experiments elsewhere in the production of building materials for local use, and tool-making workshops, are perhaps more promising. Some expansion of the exploitation of quartzite and diatomite seems probable. The use of limestone with marble and dolomite has prospect of economic use.

County boundaries should perhaps be revised.[15] It seems clear, when local authorities have so far been responsible for planning, that the future of Skye should be planned along with that of its two railheads, Kyle and Mallaig. At present there is some competition which could be replaced by rational development. The sending of Harris children to Portree Academy and not to Stornoway also suggests a need for thorough investigation.

Social and economic considerations.—There is substantial agreement among the most varied authorities that the top-heavy age structure of the population would be a less serious prospect if homes were available for the old folk, so that the younger men could take over the ' crofts,' and start families there.[16] No additional houses can be built on the croft under the present law. The old folk might be accommodated on tiny crofts, with just enough land to keep a cow ; preferably these

should be grouped, but not in whole townships of the aged. This might also safeguard the continuity of cultural traditions.

The sizes of crofts.—The survey should be specially directed to the possibility of matching the powers and needs of the family, and of the land, in other ways also—if necessary by redistributing the land. Conservatism and inertia might well be overcome by the knowledge that all who wanted a ' croft ' would get one suited to their needs. Probably the ' crofts ' for whole-time agriculture should be quite individual holdings, on the lines of the present hirsel-crofts, but with houses grouped in settlements of at least four houses. The removal of what are felt as irksome and archaic communal elements, and restoration of grouped dwellings, might well lead to a new and spontaneous co-operative movement, economic and social. The present system including some communal elements might be justified for old and part-time crofters, but improvement of the lower hillsides might allow of the abolition of the opening of the arable in winter, and give greater encouragement to improvements like liming and re-seeding.

Local initiative.—The great need for local leadership is very obvious. Vigorous crofters, schoolmasters, newspaper editors, or local gentry seem seldom to be trusted by the majority. Department of Agriculture officials are too closely concerned with government, and even agricultural advisory officers are suspect. It is possible that the churches might find a great and positive part to play.

Since the field work for this essay was carried out, there have been several hopeful signs. The Council for Skye has been formed on a broad basis of official and local representation, after initial work by Mr. J. G. Kyd, lately Registrar-General for Scotland, and after valuable initial surveys had been carried out. It has the broad purpose of advancing the well-being of the island, and is a most hopeful new factor. Press reports suggest that the negative influences touched on above do exist, but it is clear that the more progressive crofters are ready for such measures as community centres and afforestation even of part of their common grazings.

Acknowledgments are due to Dr. Arthur Geddes and to Dr. Fraser Darling for great assistance in conversation and by giving access to unpublished material—Dr. Darling allowing access to the files of the West Highland Survey ; to officials in Skye and in Edinburgh, including one in Portree who has provided perhaps the greatest single source of material ; and to Mr. Donald Matheson, B.SC., who collaborated in the field work.

The photographs illustrating the essay are by Mr. Robert M. Adam.

REFERENCES

[1] The Royal Commission on Ancient and Historical Monuments and Constructions of Scotland. *Ninth Report with Inventory of Monuments and Constructions in the Outer Hebrides, Skye and the Small Isles.* Edinburgh : His Majesty's Stationery Office, 1928.

[2] Hossack, W. A Sketch of the Geography of Trotternish, Skye. *S.G.M.*, 1930, 46 (*6*) : 337-356.

[3] Richey, J. E. The Tertiary Volcanic Districts. *British Regional Geology. Scotland.* Edinburgh : His Majesty's Stationery Office. Second edition revised, 1948.

[4] Hydro-electric development is projected at the Storr Lochs—glacial rock basin lakes in a S-N strike valley below lavas dipping gently W, and W of an intrusive sill. There is a fall of about 50 ft. in a mile. Rainfall is 80″-90″ in the catchment area of about 3½ sq. miles.

[5] The only *Kinloch* in Skye is near the head of Loch na Dal, Sleat, and the settlement does not appear ever to have been large. Although salt-marsh may provide good pasture, it is not suitable for cultivation, house sites, or beaching boats.

[6] Darling, F. F. Natural History in the Highlands and Islands. London : William Collins, Sons and Co. Ltd., 1947. Chap. 4 and 5.

[7] Stevens, A. The Distribution of Rural Population in Great Britain. *Transactions and Papers, Institute of British Geographers*, 1946.

[8] Shown by an unpublished survey of Kilmuir by the Department of Health.

[9] Geddes, A. Population in India. *Geographical Review*, 1942, and other papers.

[10] Govan, H. A. Rendel, and others. Report to the County Development Committee (of Ross and Cromarty). 1947.

[11] Statistical Account of Scotland. 1814.

[12] The New Statistical Account of Scotland. 1845.

[13] Barclay, R. S., and Darling, F. F. Recent Fluctuations in the Populations of Parishes in the West Highlands and Islands. *Occasional Communication of the West Highland Survey*, August 1948.

[14] Ogilvie, A. G. Land Reclamation in Scotland. *S.G.M.*, 1945, 61 (*3*) : 82, where it is suggested that 165 acres might be reclaimed at Portree Bay.

[15] Geddes, A., and Spaven, F. D. N. The Highlands and Isles : Their Regional Planning. Edinburgh : The Outlook Tower, 1949.

[16] This section owes much to the memorandum by Rendel Govan and others (see [10]), and to officials in Skye and Edinburgh.

SOVIET ECONOMIC GEOGRAPHY AND THE ECONOMIC GEOGRAPHY OF THE U.S.S.R.

Review by C. J. Robertson

Economic geographers of all lands will no doubt unite in welcoming the statement in the Introduction to the first of these volumes [1] that " the Party and the Government have attached great significance to economic geography." Further, we read that " Lenin and Stalin repeatedly emphasised the need to study the variety of conditions in different regions and to take them into account in the practice of socialist construction." By " socialist " present-day Russian usage means, of course, communist. This volume, though it refers only to pre-war conditions, is still of very great interest to the western reader, not only as what is claimed to be the first text-book of university standard on the economic geography of the Soviet Union, but also for the light it throws on what was at the time the orthodox ideological outlook on the subject in the U.S.S.R.

The work under review, the first and more general volume of a two-volume text-book, was published in 1940, and we owe its appearance in English almost ten years later to the Russian Translation Project of the American Council of Learned Societies, which aims to provide an insight into Russian life and thought by translating into English significant Russian works in the fields of the humanities and the social sciences. Translations are unabridged versions of the original text, so that readers can be " made aware of the traditions, concepts and ideologies by which the thinking and attitudes of the people of Russia are moulded." Thus the frequent references to the trinity of Lenin, Stalin, and Marx maintain the reader's awareness of the interplay of idea and action. Possibly some students might find it a convenience if these " genuflections," as the American editors call them, were printed in red, or marked with the sign of the hammer and sickle.

The original text is the work of seven authors, including two of the editors, Ya. G. Feigin and V. F. Vasyutin. The American edition is edited by Professor Chauncy D. Harris. Editorial thoroughness in this edition may be judged from the fact that the volume includes not only 19 additional maps—making a total of 84—and 8 additional tables—making a total of 53—but an impressive apparatus of appendices, comprising tables of equivalents, abbreviations, comparative transliterations, a glossary of Russian geographical terms, boundary changes 1939-45, citations, a short bibliography, indexes of persons (with short biographies), of plants and animals, and of places. Of notable value are the industrial maps (Figs. 27 and 28) for *c.* 1935 of the 'European' part of the Union, the Central Industrial District, the Donbas, the 'Asiatic' part of the Union—all with insets for 1913, Tashkent and Fergana, the Kuzbas.

The core of the book is formed by Chapters 2 and 3 on the distribution of productive forces, i.e. the location of industry. These chapters go some little way to fill in a picture of which the outlines were already fairly generally accessible in the Report of the Eighteenth Party Congress in 1939. Voznesensky's much publicised report on the initiation of the Fourth Five-year Plan in 1946 provided, of course, a rough provisional sketch of what was to be the development in the period following that described in this book and the war years.

Soviet geonomics at the time the book was written was most actively concerned with the development of the new coal and metallurgical bases. As events in the following years were to show, the maximum military and political advantages were to be gained by pushing on with the industrialisation of some, at least, of the widely separated regions of mineralisation, particularly of iron ore. The building-up of the Second Coal and Metallurgical Base in the Urals and Western Siberia and the industrialisation of the national republics were, however, opposed by " enemies of the people " and " rightist capitulationists " making considerable use of Alfred Weber's location theory and arguing that industrialisation of backward regions slowed down general industrial development. We see here a reflection, too, of the controversy between the protagonists of world revolution and

those of communism in one country. It is not therefore surprising to find the Weberites being blasted with the full force of the orthodox eschatology as apologists for the inefficient distribution of productive forces under capitalism. We read that " Trotskyists, foaming at the mouth, argued that a uniform distribution of productive forces was conceivable only on a world scale "—which, being translated from Marxian into the more familiar language of the " bourgeois ideologists," probably means that a considerable body of opinion thought that a fully rational location of industry was conceivable only in a world economy. " The traitor Trotsky," in fact, proposed to close large plants that were not, he maintained, yielding profits.

The building up of the metallurgical industry in the Urals was certainly hampered by the relative inadequacy of local supplies of suitable coal. Hence the great emphasis on transport economies. In the intermediate stage of building up the new regional bases it is not surprising that " Comrade Stalin repeatedly pointed out " the need to eliminate inefficient and excessive haulage. One mitigation of the difficulty was found by the Ural-Kuzbas Kombinat in the now classical 2230-kilometres pendulum transport between the ore of Magnitogorsk and the coal of Stalinsk, the need for which was later reduced by increasing output of Karaganda coal. With the vigorous development of new industrial regions, increasing length of coal hauls was still, however, a serious problem, as is indicated in Chapter 5 of this work. The problem of long cross-hauls was also attacked by planning that the principal metallurgical bases should produce all the main types of rolled metal, and with this came, too, the economies of integration.

The apparent contradiction in the often repeated emphasis in Soviet directives on locating industry near both raw materials and market is gradually reconciled as regional planning proceeds and other industrial activities and population grow up at the source of raw materials, a development greatly facilitated by the wide distribution of electric power resources. Unfortunately the chapter on population is one of the weakest in this volume, and contains much propaganda of the crudest type on such matters as "shortening of the life span of the labour population " and " increased death rate among workers " under capitalism, while communism " alone creates all the conditions necessary for a rapid increase in population." A continued high rate of increase of population with industrialisation in the Soviet Union is credited to communism and contrasted with the slowing down of population increase under capitalist industrialisation. One of the factors mentioned as lengthening the life span is " Stalin's intense concern with the human being."

Passing from the chapters on location of industry and on population to those on mineral and agricultural resources, we find ourselves in a more peaceful atmosphere but yet one not without its dangers. The summary of mineral resources in Chapter 1 (tables 4 and 5), for instance, places the U.S.S.R. in an excessively favourable light vis-à-vis the capitalist countries by generally including in reserves not only A (proved) and B (apparent) but C (inferred) deposits ; nor is any

allowance made for quality. In the statistics of coal, for instance, all kinds are added in a simple total, while for iron the total of 267 milliard tons includes no less than 200 milliard tons of the low-grade ferruginous quartzites.

While the American editors and publishers of this Russian work have done a fine job in giving it a streamlined finish, their standards of faithful presentation of the matter as originally presented to the Russian public have prevented some much-needed pruning of repetitive or otherwise redundant text, some of it due, of course, to the multiple authorship of the original. The German publication [2] under review, the work of a single author over a number of years, interrupted by the war, does not labour under this disadvantage nor under that of polemical distractions—interesting though the latter may be to the student of Russian affairs. The work by Werner Leimbach is the first volume in a new series of *Kleine Länderkunden* published under the general editorship of W. Evers of Hannover, on lines originally advocated by Penck and Credner for more pragmatic geography.

The ground covered is wider than in the Russian volume, as it includes sections on the organisation of geographical research, ethnology, settlement, and external trade, and also some treatment of trends and possibilities, as well as systematic discussion of the physical features, resources, industries, and transport. There is considerably more detail on many aspects, both physical and economic, than in the Russian work, and the author has made estimates in some cases up to 1947. Admirable care is shown in the presentation of the statistics. There is a descriptive bibliography of over 200 references, which on inspection is seen to err somewhat on the side of generosity. The book is notably rich in small sketch maps, which frequently mean a considerable saving in time to the reader. Besides the 92 maps in the text there are 65 photographs, many of them air views, generally accompanied by instructive captions. Such juxtaposed views as Nos. 31 and 32, showing respectively strip holdings, and the large fields of a kolkhoz, are particularly welcome.

With the publication of the two volumes under review the student is now provided with a range of several important text-books, each of which has 'something the others haven't got.' With a discreet blending, he should be able to construct a fair picture of the Soviet Union—as it was before the initiation of the Fourth Five-year Plan.

[1] *Economic Geography of the U.S.S.R.* Edited by S. S. Balzak, V. F. Vasyutin, and Ya. G. Feigin. American Edition edited by Chauncy D. Harris. Translated from the Russian by Robert M. Hankin and Olga Adler Titelbaum. Preface by John A. Morrison. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. xlv+620. 84 figs. 39 tables. 14 appendices. New York: The Macmillan Company, 1949. $10.00.

[2] *Die Sowjetunion:* Natur, Volk und Wirtschaft. By Werner Leimbach. $7\frac{3}{4}\times5$. Pp. 526. 92 sketch maps. Coloured map (1 : 20,000,000). 65 photographs. [Kleine Länderkunden.] Stuttgart: Franckh'sche Verlagshandlung (Kosmos-Verlag), 1950. *DM* 28.

TOURISM AND THE PEASANT IN THE GRISONS

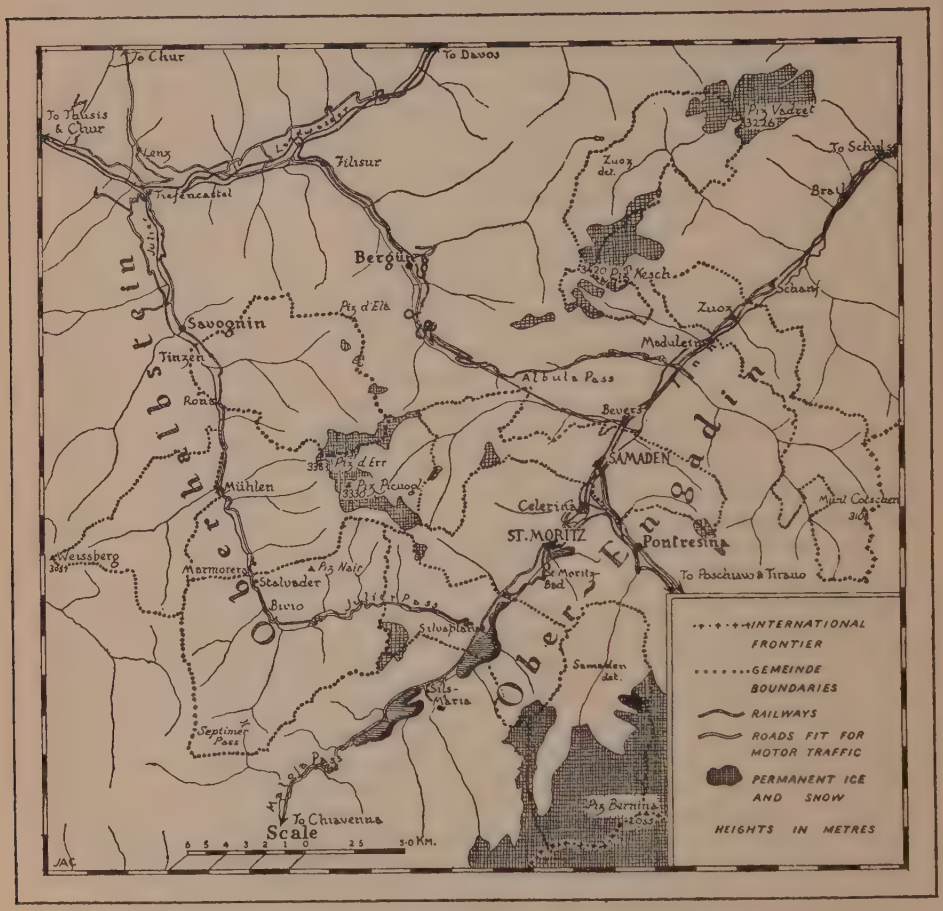
By J. A. Coker

Rural depopulation has been a familiar and persistent phenomenon in western Europe since the industrial revolution. At a time when it provided a major source of industrial recruitment and solved the problem of rural over-population, there seemed little cause for alarm. In the present century, however, many governments have shown acute concern about its effects in weakening the peasant economy. From a national point of view it seems highly undesirable to abandon resources at home whilst spending more abroad, and it is inconsistent with the spirit of the twentieth century to confess failure where former generations have been able to make a living. In spite of various measures designed to improve the condition of the marginal farming communities, the drift to the towns continues.

In the Alpine areas, and in Switzerland in particular, the spectacular growth of tourism from a purely local interest into a large-scale international industry has led to the belief that the lack of any widespread rural exodus in that country, and the comparatively prosperous condition of the Swiss peasant, can be ascribed to tourism. If this contention is true, then tourism can be encouraged wherever natural conditions are suitable, and the problem may well be partly, if not wholly, solved. Unfortunately, the relation between tourism and farming does not appear to be so simple and needs to be examined in some detail before such a general conclusion can be drawn. Several questions immediately present themselves. Does the peasant in a tourist area derive any considerable income directly as a result of higher local food prices, and by the demand for his services at a season when his farming duties are small? Does he benefit, on the other hand, only by virtue of the fact that his government subsidises him out of revenue derived from taxation which may itself be increased by tourism? In this connection it should be noted at the outset that the Swiss peasant does enjoy cheap rates on the Federal transport services, is provided with cheap electric power, and has a favoured status in taxation. Then again, if the capital for the building of hotels springs from the industrial towns, as seems likely, rather than from the Alpine valleys, do not the profits from tourism return to those towns, and the benefits only reach the peasant very indirectly in the form of an increased flow of goods at possibly cheaper prices? Finally, how much importance is to be attached to the system of farming itself, peculiarly adapted to the environment through centuries of experience, and fostered in the case of the Swiss by a good educational system? All these are questions which other countries faced with rural depopulation, and not yet having a tourist industry of comparable magnitude, need to answer. If government assistance is necessary in Switzerland to redistribute any income obtained, they would be unwise to anticipate immediate local advantages from an increase in visitors, whatever the total national financial gain might be. In this paper only one of these questions has been considered, and that for a small area;

namely, whether in certain parts of Grisons (Graubünden) [1] the direct financial benefits derived from tourism are significant in the peasant standard of living.

If tourism does affect the local standard of living, variations both in space and time may be anticipated. Prosperity should vary inversely with distance or rather accessibility from a major Swiss resort, and one would expect fluctuations in prosperity to follow rises and



Grisons : Oberhalbstein and Upper Engadine.

falls in tourist traffic, notably the fall during the war years.[2] It is possible to select many indices of prosperity, population figures often being taken as a rough indication. But gross population data can very often mask, rather than reveal, peasant prosperity. A large increase in a rural area usually represents an influx of non-farming population who may make no contribution to agricultural welfare, and who may conceal a smaller but significant decrease in the number of farmers. The tourist industry itself is also somewhat difficult to analyse. In the sense that almost every village in Switzerland has an

hotel, as is the case in most countries, the industry may be said to be ubiquitous. The main centres stand out only in a relative sense, and it is as difficult to say that a Swiss village has no tourism as that any centre exists on nothing else, although both these extremes are approached. Grisons has the distinction of having more workers employed in the hotel trade than any other Swiss canton, the figure being 4·1 per cent. of the total employed population.[3] As to the links between the hotels and the local farmer, it is necessary to note what products the latter has for disposal, and at what times of the year.

The whole of the Grisons economy is dominated by pastoralism ; nearly 70 per cent. of all holdings have less than 10 per cent. arable, while cereal crops occupy less than 0·5 per cent. of all the cultivated area. These being average figures for the canton, which includes a section of the comparatively fertile Rhine valley, figures for the higher remoter districts where tourism is more important will show an even greater preponderance of pastoralism. Milk and cheese are the primary products, and the production of meat is left to the Foreland farmer whose pastures are richer, and to whom go the bulk of the young unwanted store cattle at the autumn sales. Cheese can be made all the year round, on the alp in summer, and in the village *Sennerei* or on the home farm in winter. Fresh milk, on the other hand, is often a scarce commodity in summer owing to the distance of the cows on the alps.[3] Where transhumance involves the removal of the entire village population such milk can indeed be consumed by the villagers, but it may very well be impracticable to export it from the summer pastures. When the cattle are stall fed, it can be supplied to the hotels to meet the demands of the winter sports' season. Other crops are negligible as sources of income, both on account of the long duration of snow cover, and also since the small amount of arable land owned by each farmer is almost entirely devoted to raising winter feed for the cattle, and for such human food for the family as climatic conditions permit.

These preliminary points serve to define the field a little more closely. Precise figures cannot be obtained for the innumerable small sales of milk or cheese, and in a short paper no attempt can be made to cover the whole canton of Graubünden in detail. Our purpose will be served by a number of representative villages, and over those villages comparable measures both of the relative importance of tourism and of the standard of living.

Seven *Gemeinden* (parishes) within the canton have been selected. Chur,[1] the cantonal capital, is the only town and has been included as being a typical regional centre of considerable local importance economically as well as administratively, and as demonstrating certain features of tourism not apparent in the villages. Apart from Chur the only criterion for the choice was the general impression that the *Gemeinden* showed between them a wide range of tourist activity. Three of these, Silvaplana, Samaden, and Zuoz, are in the upper Engadine, and the remaining three, Bivio, Mühlen, and Tinzen, in the Oberhalbstein.[1] The Engadine villages are on the whole larger than those in the Oberhalbstein, but the most significant differences

arise from factors of location. Chur is very much larger than any of the others, and at 595 metres is more than 600 metres lower than the lowest of the villages. Spreading out over the large alluvial fan of the river Plessur which joins the Rhine a mile or so from the town, it is a natural route centre for the whole of the Grisons, no less so for modern visitors than when the Romans made it their headquarters of Curia Rhaetorum. Although just above the local limit of the vine[5] and on a north-facing slope, Chur has a sheltered position, with the wide floodplain of the Rhine available for autumn pasture, and abundant local alps. These features, coupled with an all-year demand for foodstuffs, would lead one to expect a high degree of farming prosperity in the *Gemeinde*. Chur also benefits indirectly from the seasonal tourist demand since, being at the terminus of the normal gauge railway track, a change of trains is necessary, and many tourists take the opportunity of spending the night in the town.

In the upper Engadine, Silvaplana, Samaden, and Zuoz are all on the *adret* facing south-east. The flood plain of the Inn provides ample valley pasture for the final outdoor summer feed, and above this, gently sloping land surrounding the villages has been extensively terraced, the terraces being the only privately owned land in the area. Movement within this section of the valley presents no difficulties, but the orientation of the valley towards Austria accentuates its isolation from the rest of Switzerland. Not one of the many passes leading from the valley has developed into a great modern trans-alpine route, the railway which crosses the Bernina Pass being of narrow gauge and not available for international traffic on any scale.[6] The hardships that this isolation imposes on the valley are reinforced by altitude. At over 1500 metres the *Gemeinden* under discussion are close to the permanent snowline ; as the only available alps are but a few hundred metres above the level of the villages, elaborate transhumance is not the rule. Hay is almost the only possible crop, and its cultivation dominates the terraces. Its greatest single modern asset, the great natural beauty of the setting, has been exploited to the full, and the railway link through the Albula tunnel with Chur was a response to tourist traffic.

The setting of the Oberhalbstein villages is in direct contrast. In place of the continuous wide valley floor, the longitudinal profile is a perfect example of glacial *verrou* topography, a succession of small basins separated by gorges of considerable difficulty. Each of these basins is occupied by at least one village, but the amount of water meadow is nowhere to be compared with that enjoyed in the Engadine. Land suitable for terracing is similarly restricted, except at Tinzen which stands in the largest of the basins. Tinzen and Mühlen at 1220 and 1430 metres respectively are able to grow a wide range of crops, but Bivio at the head of the valley is no better off than the Engadine villages in this respect.

These differences in natural advantages might suggest a corresponding diversity in the standard of living. The farmers of Chur should show greater prosperity on all counts. Concerning the villages, however, there is little point in attempting to assess their wealth on

this basis. More abundant natural resources may merely increase the number of farmers able to make a living, and the individual standard may remain fairly low. It is only where a considerable non-farming population is present and able to purchase local farming surpluses that one would expect any marked changes in the standard of living.

The first objective is to discover how far the chosen *Gemeinden* are affected by tourism. As a first approximation it was thought that a figure expressing the number of hotels or rooms available for visitors as a percentage of the total population would be sufficient. In fact, the populations of the Oberhalbstein villages are so small that the one hotel available in each case sometimes gave a higher "accommodation ratio" than for some of the Engadine villages. This is patently a distorted picture, since it contains no reference to the numbers actually using the facilities. The Engadine, centering on St. Moritz and Pontresina, is a renowned winter sports resort, and the railway is used annually by thousands of visitors. The Oberhalbstein has only a 'bus service, no facilities for winter or summer sports, and none of the multiplicity of retail shops catering for the tourist characteristic of all the settlements of the Engadine. Population changes as outlined below provide a surer, if less direct, indication of tourist importance.

	ALTITUDE	POPULATION 1920	POPULATION 1930	INCREASE OR DECREASE	%	POPULATION 1941	INCREASE OR DECREASE	%
Chur .	595 m.	15,600	15,574	− 26	·2	17,060	+ 1,486	9·6
Silvaplana	1,794 m.	294	411	+ 117	39·8	295	− 116	28·2
Samaden .	1,730 m.	1,500	1,783	+ 283	18·9	1,427	− 356	20·0
Zuoz .	1,684 m.	749	969	+ 220	29·4	693	− 276	28·5
Bivio .	1,785 m.	121	135	+ 14	11·5	172	+ 37	27·4
Mühlen .	1,430 m.	100	99	− 1	1·0	104	+ 5	5·1
Tinzen .	1,220 m.	403	376	− 27	6·7	393	+ 17	4·5

Considering these figures it is clear that between 1920 and 1930 the populations of the Engadine villages increased by surprisingly large numbers, so large in fact that it is hard to conceive of their being due to purely agricultural factors. Only Bivio in the Oberhalbstein shows a percentage increase of anything like comparable magnitude, and here the actual numbers involved are very much smaller. The Engadine group as a whole show a percentage increase of 24·4. In the absence of any industrial developments it seems highly probable that the great bulk of the increase consisted of people employed directly or indirectly in tourism. During the same period Chur remained virtually constant, and the Oberhalbstein, although showing a wide range of variation within itself, recorded a net loss of only fourteen people. This hardly suggests any marked drift to the towns. From this period, which can be taken as typical of normal pre-war conditions, we pass to 1941, by which time we can expect the war-time slump in

the tourist industry to have taken effect. The position is almost completely reversed. The Engadine villages as a group, with a percentage drop of 23·6, have lost more than they gained between 1920 and 1930, the net loss over the whole period being 128. Here again it is extremely unlikely that losses as large as these should have been sustained by purely agricultural communities as a time when the war-time food expansion programme was beginning to get under way. It is more probable that the steady gains of the Oberhalbstein group (9·7 per cent.) are representative of trends in the wholly rural areas. Swiss mobilisation may have accelerated the loss to the Engadine of its non-farming members, but this merely confirms the conclusion. It is interesting to note that Chur shows an increase of nearly 10 per cent. over its 1930 figure, and it is likely that the town absorbed some people from the Engadine. Many other towns must have shown similar increases if it is assumed that losses on the same scale as in the Engadine villages were experienced at other tourist centres such as Arosa, Davos, and Klosters, as well as St. Moritz and Pontresina in the Engadine itself.

Further evidence of the high proportion of non-farming population in the Engadine comes from the following figures concerning cow-owners. Owing to the complete dominance of pastoralism noted above, the term cow-owner can be taken as synonymous with farmer, and since the number of hired farm workers is negligible the figures can be used to give some indication of the total farm population.

	COW-OWNERS 1936	COW-OWNERS 1943	INCREASE OR DECREASE	COWS PER OWNER 1936	COWS PER OWNER 1943	COWS 1936	COWS 1943	INCREASE OR DECREASE
Chur .	117	107	−10	10·2	10·2	1198	1091	−107
Silvaplana .	16	13	− 3	11·2	14·2	179	185	+ 6
Samaden .	41	38	− 3	8·4	9·9	345	377	+ 32
Zuoz .	51	49	− 2	8·2	8·6	418	421	+ 3
Bivio .	26	31	+ 5	9·5	9·9	248	309	+ 61
Mühlen .	15	14	− 1	7·1	7·5	107	105	− 2
Tinzen .	63	66	+ 3	6·8	6·8	432	452	+ 20

Although the figures, not being of the same dates as those of the census, are not strictly comparable, one salient point emerges: that, over the whole seven-year period, changes in the farming population are insignificant compared with the total populations of either 1930 or 1941. In the Engadine this is particularly significant. Allowing for a family of five, the highest possible loss of farming population over the period is 15 in any of the three villages. It does not therefore seem likely that much of the loss of population between 1930 and 1941 was in fact a result of declining farm prosperity, and confirms the conclusion that the Engadine villages are those most affected by tourism. In the Oberhalbstein the fluctuation in the number of cow-owners

LAKES, STAZ L. FOREGROUND], SAN MUREZZAN, CHAMPFER, SILVAPLAUNA, SEGL

UPPER ENGADINE

SILVAPLAUNA [5,991 Ft.] ON ALLUVIAL FAN, AND PIZ LA MARGNA [10,355 Ft.

ZUOZ

UPPER ENGADINE

CULTIVATION TERRACES AT SAMEDAN

is of the same order of magnitude as that for the population as a whole after multiplying by five [7] and allowing for the slightly longer period involved.

There can be little doubt then that the tourist trade affects the selected *Gemeinden* to a very different degree, and consequently one would expect to find that in pre-war days the prosperity of the farmers of the Engadine was of a higher level than in the Oberhalbstein; and further, that this prosperity should show a greater proportional decline in the Engadine as the number of tourists dropped. In other areas prosperity could perhaps be measured from place to place by the variation in the size of farms. The amount of land owned personally in the alpine economy is, however, no guide to the available grazing land since the alps are invariably owned in common, either by the *Gemeinde*, or by a farmers' co-operative. It may be supposed that since the arable land provides winter feed [8] it places an upper limit on the number of cattle it is possible to keep, but the evidence is inconclusive on this point because other commonly owned grazing used in the autumn may effectively prolong the period of outdoor feeding and lower the amount of stall feeding required. The acreage of alp within the *Gemeinde* is likewise misleading, as alps are often purchased or hired outside the *Gemeinde* boundary.[9] More satisfactory is the figure for the number of cows per owner. With butter, cheese and milk the cash products, the obvious outlet for additional income is an increase in the dairy herd. It may be objected that extra alp grazing may not be available, but this may be acquired from less prosperous *Gemeinden*, and in none of the selected villages did the actual number of cows in 1943 equal or exceed the assessed carrying capacity of the alps owned.

In 1936 Silvaplana stands out as containing the most prosperous farming population on this basis. This is not surprising since it is in a unique position for supplying fresh milk in summer to the Engadine, having the only major alp reached by a motor road—the Julier Pass road. Fresh summer milk is in fact the largest single source of income in this *Gemeinde*, and the position of monopoly which Silvaplana enjoys in this respect helps to explain its high figure. Nor need any surprise be caused by the high figure for Chur, with the advantages that have been already noted. For the rest, the figures do not suggest very marked differences in standard of living. Both Samaden and Zuoz are vastly nearer to the tourist centres proper than either Bivio or Mühlen, and yet of these four Bivio has the highest figure, and that for Mühlen is not so very much below the two Engadine villages. At Tinzen the lower altitude presupposes a greater variety of crops and a less exclusive concentration on dairy products. There is clearly something wrong with the assumption that the standard of living is higher in those areas adjacent to tourist centres.

From the figures for 1943 the suspicion is confirmed. Too much attention should not be paid to the very marked increase in the cows-per-owner figure at Silvaplana by this date, since it is occasioned by a fall in the number of owners rather than by an increase in the number of cattle. Even so, the Engadine group as a whole maintains its position. The changes in cattle population and in the number of farmers suggest

a stable economy rather than one hard hit by the loss of local markets. It is possible that the war-time food drive offset any depression, and that losses in farming might well have been greater but for the need to increase production. But this factor might reasonably be supposed to have operated everywhere, and it is difficult to understand why Chur in particular, and Mühlen, show losses rather than gains in the number of their cattle. Herd increases in the Oberhalbstein are accompanied by increases in the number of farmers, and wealth per owner remains substantially unchanged. This again does not suggest an all-round increase in production.

The changes in actual farming population between 1936 and 1943 show a consistent decline in all the Engadine villages, and this may be a truer indication of local war-time contraction, particularly as the Oberhalbstein shows a change in the opposite direction. The numbers are everywhere small, however, and against this is the large herd increase at Samaden and also the fall in both owners and cattle numbers at Chur where there is no reason to expect it.

It appears that in normal times the strictly farming population of the tourist areas is very little if any better off than that in the non-tourist areas, and the fall in prosperity consequent upon the loss of tourist trade is almost negligible. The appearance of the villages suggests that those in the Engadine have larger and better houses and buildings, but in nearly all cases these are connected with hotels or retail shops and, being new buildings, are naturally more conspicuous. One interesting pointer to the general progress of the village economy is the survival of compulsory winter work for all farmers using the alps. Apart from Chur, in only one of our villages is it possible to commute these *Gemeinde* services by a money payment. That exception is not in the largest village, Samaden, nor yet in the Engadine, but at Tinzen, and the amount of this *Gemeindearbeit* reaches its maximum at Silvaplana. This helps to explain the fact that winter employment in hotels is of no great importance. In none of the selected villages do farmers as such work in hotels in winter, and the former practice of providing sledging parties for visitors at Silvaplana has been relinquished to the full-time hotel employee. This general lack of interest in part-time hotel work and also in any form of winter craft is partly a result of the increasing organisation of tourism and the growth of fully serviced tours, but is mainly an indication of the amount of work needed on the farm. Quite apart from the routine duties of feeding and milking the stock, the amount of fencing, stone clearance, maintenance of drainage ditches, and repairing of avalanche walls is considerable. The winter rest in farming operations is by no means complete, and there may be little time to spare for other activities.

Such benefits as accrue to the region and to the farming section of the community in particular are of a much less tangible and direct nature than an increase in income. The railway, the construction of which was undoubtedly accelerated by tourist demand, has lessened the isolation of the Engadine, but it has brought no immediate benefit to the farmer unless he wishes to produce a perishable product, milk,

rather than a non-perishable one such as cheese. The highest cows-per-owner figure is at Silvaplana, not reached by the railway. As for the supply of food to the hotels, we have seen that only one commodity, or at the most two, can be supplied locally, and that not always at the time of greatest demand. To offset even this possible increase in income is the fact that increases are also likely in the price of clothes and other consumer goods, as well as of building materials and casual labour, so that the overall standard of living may not change for the better even if money incomes rise. Profits from the hotels are not likely to be invested in local farming in a region where climatic conditions preclude the production of the variety of foodstuffs needed by the hotels.

In the national economy tourism benefits both the hotel owners and the producers of consumer goods required by the trade ; without it the Swiss economy would be poorer in many ways, especially in foreign currency. But to retain a flourishing peasant community in the alpine areas it is necessary for the Federal Government to re-distribute some of that income in ways we have already noted. It is suggested that this necessity for government action in a country which for its size and population has the finest tourist organisation in the world should be borne in mind when the extension of tourism is considered in other areas.

Photographs of the Upper Engadine by H. Albert Steiner, San Murezzan, and of Zuoz by M. Pilet, Geneva, by courtesy of the Swiss National Tourist Office, London, W.C. 2. The photograph of the terraces at Samedan is by Mr. P. S. Bentley.

NOTES

[1] Some confusion may arise as to the spelling of names in the Grisons, owing to the prevalence of Romansch, and some Italian as well as the more usual German. Although all the selected *Gemeinden* are Romansch-speaking with the exception of Chur, the German spelling has been used as being more familiar. With the official recognition of Romansch as a fourth language of the Federation, the following variations may well occur on local maps, signposts, and official notices.

German	*Romansch*	*Italian*
Bergün	Bravuogn	
Bivio	Beiva	Stalla
Celerina	Schlarigna	
Chur	Cuera	Coira (*French* Coire)
Engadine	Engiadina	
Graubünden	Grischun	Grigioni (*French* Grisons)
Julier	La Güglia	
Marmels	Marmorera	
Mühlen	Mulegns	Molins
Oberhalbstein	Sursés	
Pontresina	Puntraschigna	
Samaden	Samedan	Samedani
St. Moritz	San Murezzan	
See	Lej	Lago
Sils	Segl	Seglio
Silvaplana	Silvaplauna	
Tiefencastel	Casti	
Tinzen	Tinizong	

[2] The use of the word war-time is taken throughout the paper to mean the years 1939 to 1945. Switzerland was not, of course, actively engaged, but the defence measures, rationing, and general trading difficulties make the term war-time economy as applicable here as in belligerent countries.

[3] The full figures for the Grisons in 1946 are as follows :—Agriculture 38% ; Industry 26% (the lowest for Switzerland) ; Public Service 6·4% ; Transport 5·7% ; Commerce 5·6%; Hotels 4·1% ; Domestic service 3·9% ; Others 10·3%.

[4] Zuoz and Silvaplana are 15 km. and 14 km. distance respectively from their farthest alp, and the latter reaches its Alp Margun by a rough path over a col at 2,760 metres.

[5] The vine was formerly grown well into the Hinter and Vorder Rhine valleys until the phylloxera epidemic at the turn of the century. Since that time the industry has not re-established itself except at and below Sargans, several miles downstream from Chur.

[6] The rail track does continue into Italy, but its main use is to supply Poschiavo from the rest of Graubünden, and the traffic across the frontier is very small. Poschiavo has a tourist trade of some importance.

[7] In the Grisons, the average number of children per family is 2·93, and the average family can therefore be taken as five.

[8] No winter feed is purchased from outside in normal years.

[9] Alp Valetta, within the *Gemeinde* boundary of Bivio, is not owned by that village but has to be hired.

REVIEWS OF BOOKS

EUROPE

Our Rivers. By J. W. Kempster. 8½×5½. Pp. xi+300. 20 plates. London : Geoffrey Cumberlege, Oxford University Press, 1948. 25*s*.

The late author of this book evidently was an authoritative river fisherman since much of his volume refers to salmon and river trout and their habits and legislation affecting them. But river pollution, sewage disposal and allied interests are also considered. Water-supply gets relatively little notice. The book has its place and value though it has little geographical interest and omits mention of several important streams. There is a useful bibliographical appendix.

R. N. R. B.

The Outer Hebrides in Relation to Highland Depopulation. By William Adams Hance. 8½×5½. Pp. xv+148. 9 maps. Bibliography. [Ph.D. Thesis, Columbia University.] Lithoprinted. New York : William A. Hance, 1949.

All who are concerned with Highland affairs will welcome this account of conditions within the Outer Hebrides, for the author, an American, paints a balanced and unbiased picture.

The Outer Hebrides, in sharp contrast to most of the rest of the Highlands and

Islands, showed no population decline until the 1920s; elsewhere the decline set in about 1850. The author considers that the maintenance or growth of Highland population, regardless of social or economic cost, is not desirable and that unless sound solutions can be found, presumably depopulation should continue. A fair degree of prosperity reigns in the islands to-day and loss of population by migration is much reduced. This prosperity, however, is absolutely dependent on the secondary —or complementary—industries of which fishing, weaving, carding, seaweed gathering, and the tourist industry are most important. An analysis of crofting shows that agricultural practices still require much improvement in spite of much assistance, both financial and practical, which has been received. Land congestion is probably the greatest problem, and, short of forcible eviction, seems almost insoluble.

It is stated that Hebridean experience shows that Highland problems can never be solved by relying entirely on agricultural improvements and that supplementary industries could be greatly extended elsewhere in the Highlands. This is undoubtedly true but, while stressing the geographical similarities of the two areas and noting their contrasted population trends, little is said about the non-Hebridean areas in respect of their peoples, the evolution of their settlement patterns, nor of their agricultural practices.

This treatise provides a lucid and concise description of the islands of the Outer Hebrides and will prove a most valuable work of reference. A very full bibliography is provided, and there are numerous statistical tables and maps, but unfortunately few of the latter are original. P. M. H.

St. Columba and Hinba and Na h'Eileacha Naomha. The Whirlpool of Corrievreckan. By the Hon. Arthur Murray, C.M.G., D.S.O. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. 28. 9 illustrations. Chart and sketch map. Privately printed, 1949.

The problem of identification of Insula Hinbinae, mentioned by Adamnan, possibly with Na h'Eileacha Naomha, one of the Garvellachs and containing early Christian monuments, is debated in this well-produced brochure, which has since been published by Messrs. Oliver and Boyd Ltd. The note on Coire Bhreacain [cf. W. A. Fisher, *S.G.M.*, 1946, 62 (2)] was written by Hilda, Lady Murray of Elibank, and originally published in *The Glasgow Herald* in 1925. I. E. C.

A Hundred Years in the Highlands. By Osgood Hanbury Mackenzie of Inverewe. Edited with an additional chapter by M. T. Sawyer of Inverewe. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. 221. 9 illustrations. Map. London: Geoffrey Bles Ltd. New and revised edition, 1949. 12*s* 6*d*.

This new and revised edition of Sir Osgood Mackenzie's fascinating description of life in the Highlands of Scotland during the nineteenth century will be warmly welcomed not only by nature lovers, but also by students of folklore and old customs. There is no other book at all like it, and there is no one who could have described this countryside with better knowledge and love than the laird of Inverewe—born in 1842—who created from an inhospitable peninsula of Torridonian sandstone covered with shallow peat, the garden of exotic plants and trees which in 1948 drew no fewer than 700 visitors to inspect its treasures gleaned from all parts of the world. Inverewe is now one of the most famous gardens in Britain. Mrs. Sawyer, the author's only child, who inherited the garden after her father's death in 1924, contributes an additional chapter to this edition of the book which will be of great interest to gardeners. She has evidently inherited her father's ' green fingers.'

One of the most remarkable, though sad, facts which emerges from this study of more than a century of Highland wild life—for the author drew some of his information from notes taken by his uncle and grandfather, the latter born in the eighteenth century—is the almost complete disappearance of so many species of rare, and even not so rare, birds from the Highland scene. In the past there was much wanton and thoughtless destruction of wild life. It is to be hoped that modern methods may not yet be too late, in some cases at least, to preserve from extinction interesting and valuable species.

The book is illustrated with beautiful photographs by Robert Adam and others. I. W. H.

The Buried Barony. By ALASDAIR ALPIN MACGREGOR. 8½×5½. Pp. xv+163. Frontispiece. 54 illustrations. London : Robert Hale Ltd., 1949. 12*s* 6*d*.

This book contains chapters on a variety of Scottish subjects. " The Buried Barony," which provides the title, is an arresting description of the Culbin Sands and the great storm of 1694, which completed a devastation going on for many years in this exposed corner of Scotland on the shores of the Moray Firth. The second chapter, " Spanish Gold," describes the many efforts made in the course of the past and present centuries to raise the Tobermory galleon. It is sure to be read with interest at the present time when yet another attempt is being made to resurrect this historic vessel. Other chapters describe the life of Sir Andrew Wood and other " Sea-dogs of Scotland " ; the gypsies of Kirk Yetholm ; the old mystery of " Who shot the Red Fox " Colin Campbell of Glenure, in 1752, when Scottish justice went into eclipse and the Duke of Argyle's packed jury at Inveraray sentenced James Stewart of the Glen to be hanged for a crime he did not commit ; The Pass of Corrieyarrack ; Rothiemurchus ; and Covenanters' Conventicle, dealing particularly with Rullion Green and the annual service held there in commemoration of the Martyrs of the Covenant.

Much interesting research is embodied in these readable articles, which are attractively illustrated by the author's own excellent photographs. I. W. H.

Cairnhill. By HAMILTON MORE NISBETT and the late STAIR CARNEGIE AGNEW. 8½×5½. Pp. 215. 18 illustrations. Edinburgh : The Moray Press, 1949. 16*s*.

The house of Cairnhill stands " on a slight eminence above the Monkland Canal," and its name first appears in 1641, when James Cleland of Faskine sold " the part of his property called Cairnhill to John More in Shawhead." This book is an account of a house and its inmates—Nisbett, More, Cleland, and their ramifications. Though the author modestly calls the house " quite uninteresting " and its inhabitants " quite undistinguished," the historically-minded reader will dispute this, and will find very much of interest and also importance to historians in the volume, to which the late Stair Carnegie Agnew has added research into such families as Primrose of Dunipace, Foulis of Ravelston, Campbell of Jura, and others. The book is lighted by flashes of pawky humour and such interesting side-lights of information as the origin of the name Murrayfield, named after Archibald Murray of Cringletie in the eighteenth century, but formerly known as Nisbetfield, being part of the Dean estate of the Nisbets of Dirleton.

It is a pity that such valuable family records are not published more frequently. The volume is very attractively bound and illustrated. I. W. H.

Bedfordshire. By LAURENCE MEYNELL. 8½×5½. Pp. xv+366. 49 illustrations. Sketch map. [The County Books.] London : Robert Hale Ltd., 1950. 15*s*.

Bedfordshire is a county which many have traversed, but few have stopped to explore ; yet there are some fair prospects in this shire, and some very pleasing specimens of that most agreeable creation of the English national genius, the country village.

To the geographer, the best part of this welcome addition to *The County Books* series is the first three chapters, dealing with physical features, agriculture and the history of the county, all admirably summarised. The remaining six chapters deal in turn with the County Town and its association with Bunyan, and the North, the East, the South and the Luton district, chiefly with the architectural and historical aspects. The chalk country could have been given more space, for Dunstable Downs and the Barton Hills are excellent examples of typical chalk country, while the parish of Whipsnade could surely have been spared a paragraph.

On p. 3, also in the Index, Leagrove should read Leagrave ; on pp. 30 and 31, Cardington should read Caddington ; and on p. 127 there would seem to be some confusion as to dates. These minor points apart, the author has done his task well, and the book is liberally sprinkled with caustic but good-natured remarks indicative of his predilections. The photographs are excellent. R. B. S.

The West of England. By RUTH MANNING-SANDERS. 8⅛×5½. Pp. viii+152. 117 illustrations. End-paper sketch maps. [The Face of Britain Series.] London : B. T. Batsford Ltd., 1949. 12*s* 6*d*.

Midland England. A Survey of the Country between the Chilterns and the Trent. By W. G. HOSKINS. 8½×5½. Pp. viii+120. 108 illustrations. End-paper sketch maps. [The Face of Britain Series.] London : B. T. Batsford Ltd., 1949. 12*s* 6*d*.

Illustrated descriptions of this or that part of the country are numerous. Cornwall and Devon get more than their share. The Midlands and heart of England are generally overlooked. These two volumes, which are in the admirable *Face of Britain* series are excellent, especially the second. They are both historical and geographical and avoid the usual faults of being potted guide-books and mere comments on the illustrations which, by the way, are well chosen and excellently reproduced. Both volumes are well worth attention. R. N. R. B.

Severn Stream. By BRIAN WATERS. 8½×5½. Pp. 206. 17 illustrations. London : J. M. Dent and Sons Ltd., 1949. 15*s*.

Having written of the lower reaches of the Severn in a previous work [see *S.G.M.*, 64 (2) : 101], Mr. Waters now takes us on a rambling journey along the river from its source in the Plynlimmon mountains to Tewkesbury. It is a leisurely but enjoyable journey through the former woollen towns of Montgomeryshire and the early industrial centres of Coalbrookdale, Ironbridge and Coalport. We meet or hear of characters, both past and present, who have been associated with the river in various ways. The author appears to have a particular interest in poachers, who figure prominently, but there are many others : bargemen, riverside innkeepers, and the industrial workers.

The photographs are good, but having commented so favourably on the inclusion of a map in *Severn Tide*, one has now most regretfully to note its absence in the present volume, and at the same time to deprecate the very loose reference to " the inch Ordnance Survey " on p. 141. R. M. P.

Ulster. By HUGH SHEARMAN. 8½×5½. Pp. xii+427. 49 illustrations. Sketch map. [The County Books.] London : Robert Hale Ltd., 1919. 15*s*.

Ireland to the average Briton is a mystery coloured by what may be summed up as ' southern blarney,' and his understanding of that most passionately British part of the United Kingdom, Northern Ireland, is often sketchy. Mr. Shearman's book provides a useful corrective. An Ulsterman and proud of it, his knowledge and love of Ireland as a whole is deep and his judgments are fair. His steadfast advocacy of Belfast over Dublin culturally as well as commercially may come as a surprise, but he is convincing. *Ulster* is no ordinary guide-book, but is built on sound geographical foundations. The author first sets out to demonstrate that NE Ireland has always been a geographical unit remote from the rest of the island. He then deals with its history, industry, government, peoples and scenery. In short, it is a regional study with plentiful additions of humanity and humour. It is a pity that Mr. Shearman refers to Carboniferous Limestone as chalk, but there are no really major blemishes. H. P. W.

Ireland. Edited by L. RUSSELL MUIRHEAD, M.A.(CANTAB.). 6¼×4. Pp. lxxii+296+(atlas) 31. 15 maps and plans. [The Blue Guides.] London : Ernest Benn Ltd. Second edition, 1949. 15*s*.

Like others of its series, this serviceable guide is introduced with a brief outline of the history and antiquities of the country. General indications are also given for walkers as to some of the qualities of the countryside in different parts of Ireland. The value of the short section on the Irish language would be increased by some general indications of pronunciation. The bibliographical note could be usefully extended. A short list of Irish writers that omits James Joyce is, to put it mildly, rather imperfect. C. J. R.

Dublin : A Study in Environment. By JOHN HARVEY. 8½×5½. Pp. xii+116. 161 illustrations. End-paper maps. ["British Cities" Series.] London : B. T. Batsford Ltd., 1949. 15*s*.

The illustrations collected in this volume not only maintain but enhance the reputation of the series. They are accompanied by a text glowing with the enthusiasm aroused in the author not only by a Dublin that "seems to foreshadow the qualities of a new type of supranational city," but by an Ascendancy culture of the seventeenth and eighteenth centuries in which "uncommon sense incorporates English rule in Irish tradition." Mr. Harvey is one of those who feel that Ireland may prove to be a reservoir for humanism in Western Europe.

A very welcome feature of this volume is the chapter on the surroundings of Dublin, describing the geology, water-supply, settlement and administrative units in a way that will arouse interest and encourage further study by the reader. The social geography of the city itself is then discussed and the history of building traced to show how "local stone and local culture" combined to form modern Dublin. This is a book that should increase the enjoyment of Dublin for many visitors.

C. J. R.

Iceland Yesterday and To-day. By HORACE LEAF, F.R.G.S. 8½×5½. Pp. viii+205. 18 Photographs. Coloured map. London : George Allen and Unwin Ltd., 1949. 15*s*.

In helping to fill the rather conspicuous lack of an up-to-date picture of life in Iceland this intimate account of both past and present is certainly to be welcomed. Mr. Leaf, who has travelled widely, is able to discuss with enlightenment several vital national problems, and presents a very fair and encouraging eye-witness account in lively style. He brings out the spirit of the people, their re-awakened national consciousness, and their sense of Iceland's destiny in world affairs. The book gives interesting side-lights on many aspects which form an integral part of the life and character of the people. The author describes some of his extensive journeys throughout the island, the people that he met, and the more important historical associations of places visited. He gives a clear impression of the rapid modern development which is such a feature of Iceland to-day.

Unfortunately, place-names are rather frequently misprinted, and the map is not quite adequate nor up to date ; however, the printing and illustrations are excellent.

J. C. B.

The Viking Lands. By GORDON YOUNG. 8½×5½. Pp. 154. 17 illustrations. End-paper sketch maps. London : Evans Brothers Ltd., 1949. 9*s* 6*d*.

An enthusiast for the Scandinavian lands and people provides a study of Norway, Denmark, and Sweden, which has little geographical intent but provides a pleasant introduction to a visit to those lands, and particularly to their capitals.

R. N. R. B.

The Norway Year Book, 1950. Edited by SVERRE MORTENSEN and A. SKØIEN. 7½×5. Pp. 419. Frontispiece. Oslo : Johan Grundt Tanum, 1950.

The fourth issue of this valuable year book is most welcome since it provides a conspectus of developments in the social, economic, and cultural life in Norway that have taken place during the fateful years since 1938 when the third issue was published. It is not an ephemeral tabulation of statistics, but a readable symposium, different aspects being treated by specialist contributors : Topography, Polar possessions, climate, flora and fauna, people ; history, government, and administration ; religion and public instruction ; population and social conditions ; science, literature, and the arts ; travel and sports ; natural resources and industry. Other articles deal with foreign trade, banking, insurance, and civil aviation. J. H. K.

ASIA

A Handbook for Travellers in India and Pakistan, Burma and Ceylon, including the Portuguese and French Possessions and the Indian States. Edited by Sir Gordon Hearn, C.I.E., D.S.O. $7\frac{1}{4}\times4\frac{3}{4}$. Pp. cxxiv+792. Maps and plans. London: John Murray. Sixteenth edition, 1949. 42*s*.

This *Handbook* to the monuments of what may be called "All-India" is itself a monument—the first edition began in 1859; it is in excellent repair! Thus, the chapter on "History and Architecture" closes with the Mutiny of 1857—accompanied by a map and plans of Mutiny fighting and by abundant text later. One reads of the taking of Burma by the British troops (1852-85), but one looks in vain for mention of the taking of Burma by other troops in a more recent war. Not that the publisher's claim that the work is up to date is untrue. It seems fully justified: there is a new Index, and so on.

It is the point of view which is so curious a relic of the well-to-do British sightseer from, say, 1859 to 1914 or the virtual ending of 'Empire' at the gorgeous Delhi Durbar of 1911. The chapter on "History"—as closed in 1857—is followed by a section on the "British Government of India" (*i.e.* its bones or structure) from 1647 until "it came to an end in 1947." Or if we go back to "beginnings," we shall find mention of the re-discovered Indus sites of 3000 B.C. (p. cxvi); yet in the section on religion (p. xlix) there is no hint of the immemorial pre-Vedic roots of the Hindu pantheon discovered on these sites. Even in the section on travel one learns of upper-class comfort by rail—there is, of course, no mention of the economical Intermediate Class, the 'Missionary First,' on which one may learn so much of the landscape and its people from its own educated inhabitants, still less of Third Class. But one is left ignorant of what are the conditions of travel by road—whether by private car or by 'bus, according to the seasons or the region. And although a map of air routes is given (p. xxviii), one finds no hint of the difference in the internal air routes according to the season, and what one may see on such magical journeys.

There is a need for a new Handbook to "All-India." For one thing, some would-be travellers with eyes in their heads and wonder in their minds have small purses. But above all, the new Handbook must not underestimate the intelligence and interest of English-speaking visitors in the landscape and life, in country and town, and in an "All-India" not only of yesterday, but of to-day and its latent to-morrow. A. G.

Robert Knox in the Kandyan Kingdom. Selected and edited by E. F. C. Ludowyk. $7\frac{1}{2}\times5$. Pp. xxviii+175. 4 photographs by the late Lionel Wendt. End-paper map. London: Geoffrey Cumberlege, Oxford University Press (Indian Branch), 1948. *Rs* 6, or 9*s*.

Robert Knox was a prisoner on parole in the Kandyan Kingdom from 1660 to 1679 and afterwards wrote two books of which this is an abridgment. The publication under review gives a very attractive account of independent Ceylon as seen through the eyes of an average and sympathetic man. C. R. V. G.

White Stranger: Six Moons in Celebes. By Harry Wilcox. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. 384. 24 illustrations. Sketch map. London: William Collins, Sons and Co. Ltd., 1949. 16*s*.

Mr. Wilcox found his paradise among the Torajas, former head-hunters living in the highlands of Celebes. *White Stranger* is the result of six months' sojourn among these people. The narrative and illustrations are excellent. C. R. V. G.

MADAGASCAR

Madagascar. By Hubert Deschamps. $7\frac{1}{2}\times5\frac{1}{2}$. Pp. 188. 16 photographs. 3 sketch maps. Paris: Éditions Berger-Levrault, 1947. 165 *fr*.

The author, for ten years an administrator in Madagascar, has written a miniature encyclopedia on this miniature continent. Dealing as he does with so many

aspects, it begins to be a guide-book, or blue-book, rather than a geographical study, but it is nevertheless founded on a neat systematic description of the physical setting, and if not wholly geographical, it does provide a handy source-book.

One would wish that some answers might have been suggested for fundamental problems such as the utilisation of the vast marshy areas of the island, or of the lateritic areas, instead of somewhat calmly accepting the proposition that Madagascar has largely the shape, colour, and fertility of a brick. R. M.

AMERICA

Histoire de la Grande Pêche de Terre-Neuve. By Robert de Loture. $7\frac{1}{2}\times4\frac{3}{4}$. Pp. 255. 1 fig. 2 sketch maps. Paris : Librairie Gallimard, 1949. 325*fr.*

An account of the cod fisheries of Newfoundland is welcome. This small volume is both descriptive and explanatory and treats of the history as well as of the present economic status of the fishery. There is also a chapter on the little-known French islands of Saint-Pierre and Miquelon. R. N. R. B.

Grassland Historical Studies : Natural Resources Utilization in a Background of Science and Technology. Vol. 1. Geology and Geography. By James C. Malin. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. xii+377. 3 illustrations. 2 maps. [Lithoprinted.] Lawrence, Kansas : James C. Malin, 1950. $2.50.

This is an interesting study of development in the early days of the United States of America. It deals with natural resources and the development of these with particular reference to transport, planning and the location of towns. It should be of great interest to students of geography, since in a young country there are few, if any, complications such as must be faced in an old settled country with a dense population.

This volume should therefore serve as a very useful introduction to those interested in, or studying, such problems. E. W. F.

South America called Them : Explorations of the Great Naturalists Charles-Marie de la Condamine, Alexander von Humboldt, Charles Darwin, Richard Spruce. By Victor W. von Hagen. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. xiv+401. 28 illustrations. London : Robert Hale Ltd., 1949. 21*s.*

The scientific exploration of South America began relatively late and still is far from finished, and it was not until about a century ago that modern industrial interests began to be awake to the value of the continent. Mr. von Hagen, who knows well much of South America, including the remote Galápagos Islands, has retold from original sources the pioneer journeys of Charles-Marie de la Condamine who made the earliest accurate chart of the Amazon in the eighteenth century, Alexander von Humboldt in Venezuela and the Andes early in the nineteenth century, Charles Darwin in 1831 and 1835 as naturalist of the *Beagle*, and finally, and most prolonged, Richard Spruce from 1849 to 1864 on the Amazon and Rio Negro. The author has done his work well and made a fascinating volume of travel with a vivid picture of many South American scenes. R. N. R. B.

A Naturalist in the Gran Chaco. By Sir John Graham Kerr, F.R.S. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. xi+235. 24 plates. 2 sketch maps. Cambridge : University Press, 1950. 21*s.*

In the compass of this short but extremely fascinating book, the author has given an account of his two well-known expeditions into the Pampa-Chaco area of Central South America. The first expedition in 1889-91 navigated the rivers Paraná, Paraguay, and Bermejo, and was in the nature of a general exploration. The second in 1896-97 was undertaken with the specific object of studying *Lepidosiren*, the lung-fish of that area, in its native haunts. This creature, of great zoological interest, is a relic of the past. The account is compiled from diaries kept by the author at the time and is illustrated mainly by the author's own photographs. The natural history of the area and the general work of the expeditions are described in detail, and an account is also included of the customs and manners of the Natokoi, with whom the author lived for a period ; they are a tribe of Redskin Indians, living on the lower Pilcomayo in a very primitive state.

These journeys added much to our knowledge of the country and its natural history, and we are fortunate in having this general account, which contains much hitherto unpublished information. The vivid and lucid manner in which it is written makes the volume most interesting reading for the layman and trained naturalist alike.

A. C. S.

OCEANIA

Island Administration in the South West Pacific : Government and Reconstruction in New Caledonia, the New Hebrides, and the British Solomon Islands. By Cyril S. Belshaw. 8½×5½. Pp. viii+158. 4 maps. London and New York : Royal Institute of International Affairs, 1950. 12*s* 6*d*.

This is an extremely interesting and thoughtful book devoted to the government and post-war reconstruction problems of New Caledonia, the New Hebrides and the British Solomon Islands. The New Hebrides and Solomons are broadly similar, but inclusion of New Caledonia in the study is perhaps a little strange since economic resources plus extensive European and Asiatic immigration give the French colony a fundamentally different character from the other islands.

Mr. Belshaw wisely stresses the danger of overlooking the fact " that sociological problems are fundamental to the solution of administrative and development ones." One of his details might well be given the widest possible application by those of us who regard the British-American system of democracy as a panacea : " Melanesians prefer not to decide upon a project if there is going to be dissent. They prefer to discuss and discuss and discuss again until dissentient opinion is quietened. . . . If we insist that voting should be by majority rule . . . we will damage this most important element tending towards social cohesion. . . . We have no justification for imposing our own procedures in opposition to well-tried native methods."

C. R. V. G.

Fijian Village. By Buell Quain. Introduction by Ruth Benedict. 9×6. Pp. xvii+459. 17 plates. 7 sketch maps. Glossary. Chicago, Illinois : University of Chicago Press, 1947. London : Cambridge University Press. 27*s* 6*d*.

This posthumous work embodies the results of field work carried out in 1935-6 in the village of Nakoroka on the island of Vanua Levu. Various aspects of the native culture are described, the account of rank and chieftainship being particularly interesting. The whole work is made vivid by delineation of individual characters and descriptions of actual episodes in native life, though the latter are not always well integrated with the more general description of social structure. This is particularly true in the chapter on " Livelihood," where it is difficult to disentangle the general principles of land utilisation, ecology and economics from particular descriptions of, for example, hunting expeditions and individual gardening activities.

Perhaps the most valuable section of the book is the historical account of the alien cultural influences—first from Tonga and later from European culture—which have affected life in the village. In this section the author shows a scholarly ability to integrate historical and documentary accounts with the results of his own field work. Incidentally, his account shows once more how even the most well-intentioned colonial policies may be deleterious or ineffective through lack of understanding of native life. For example, government decrees obliging natives to build more houses—on hygienic grounds which are not understood by the natives—have meant that " housebuilding is the greatest chore for both official and citizen . . . [and] has become a symbol of oppression " (pp. 64-5) ; again, the hygienically excellent rule that pigs must be kept in pens and not allowed to wander about the houses and the village has simply meant that " when an official is seen to approach the village, there is a tremendous scuffle and din while the children scurry in and out of the houses and through the coconut groves to catch pigs and carry them squealing to their pens " (p. 69).

Altogether, the author has made a valuable contribution to the ethnography of the Pacific. His premature death in 1939 meant the loss not only of a promising scientist, but of a man with a sympathetic understanding of his fellow human beings.

R. P.

Polynesian Trade Wind. By Sverre Holmsen. Translated from the Swedish by Joan Bulman. 8½×5½. Pp. 186. 29 illustrations. End-paper sketch maps. London: James Barrie Publishers Ltd., 1949. 15*s*.

The last few years have brought a spate of South Pacific Island travel-books, and first reactions to *Polynesian Trade Wind* are that it is strange the publication of another, involving translation from the Swedish, should have been considered worth while. These reactions are, however, very unfair, for the book possesses singular charm and is one of the best of its kind. The islands covered are Tahiti and smaller members of the Society Group, including Bora Bora—the most beautiful of them all and "like the memory of a dream." The book appears to have been written in the 1930s, before World War II left its unhappy impress on the South Pacific. C. R. V. G.

The Kon-Tiki Expedition: By Raft across the South Seas. By Thor Heyerdahl. Translated from the Norwegian *Kon-Tiki Ekspedisjonen* (1948) by F. H. Lyon. 8½×5½. Pp. 235. Frontispiece. 18 plates. London: George Allen and Unwin Ltd., 1950. 12*s* 6*d*.

This story of a great adventure, a voyage by raft from Peru to the Tuamotu Islands, is a Book Society choice and so requires no further recommendation. The venture was undertaken to prove the practicability of the author's belief that Polynesia was peopled from South America, not from the westward as is generally understood.

Certain cultural affinities between America and Polynesia have long been recognised, and these are most obvious in the more easterly islands. Mr. Heyerdahl begins by insisting that the entire Polynesian stock came from the eastward, but in Chapter VI appears to imply that the islands were already occupied when the migrants from South America arrived. Evidence that most of the ancestors of the Polynesians came from the westward is overwhelming. General tradition insists that their earlier home lay in the direction of Java, but further traditions of subsequent inter-island migrations, such as that of the Morioris and Maoris from Rarotonga to New Zealand, cause some confusion. The *Kon-Tiki* voyage, however, has demonstrated that some hundreds of pre-Incas may well have reached and conquered certain islands, bringing a culture which spread over a much wider area.
C. R. V. G.

POLAR REGIONS

We Live in the Arctic. By Constance and Harmon Helmericks. 9×6. Pp. xiv+321. 3 diagrams. 30 illustrations. Decorative end-paper sketch maps. London: Hodder and Stoughton Ltd., 1949. 20*s*.

To those of us who enjoy solitude and a strenuous life this is a wholly delightful book. The two authors whom we have previously met in *We Live in Alaska* spent most of the year in a log hut at the confluence of the Kotyuk and Alatna rivers in the Yukon Basin. They chose the site, built the log cabin, and also entirely supported themselves by hunting. Life was a bit precarious at times. For a whole year they saw no other human being. The book gives a vivid picture of life on the edge of the tree belt. R. N. R. B.

OCEANOGRAPHY

The Sea and its Mysteries. By John S. Colman. 7½×5. Pp. 285. 17 plates. 36 figs. Map. London: G. Bell and Sons Ltd., 1950. 12*s* 6*d*.

There are comparatively few works on oceanography, and this small but comprehensive volume is a welcome addition to their number. Dr. Colman, with a wide experience of the seas, has a predilection for the biological side but does not neglect the physical aspects of the subject. He does not, however, claim to have produced a text-book. Perhaps that is why the chapter on currents is weak as regards Arctic waters and why there is a lack of study of deep-sea deposits. But the book is most readable and gives an admirable survey of a vast subject. A short bibliography is useful, and there is a folding map of ocean depths. R. N. R. B.

Les Richesses de la Mer.: Technologie biologique et océanographique. By NOËL BOUDAREL. 10×6½. Pp. 549. 1006 figs. [Encyclopédie Biologique, XXIX.] Paris: Paul Lechevalier, 1948. 1500 *fr.*

Copiously illustrated with excellent line-drawings, this account of marine plants and animals and of their economic exploitation is devoted to practical and scientific aspects. The introductory oceanographical matter, dealing with historical and physical data, is perhaps the least satisfactory part of the book. But four-fifths of this welcome addition to a well-established series of authoritative works on biological subjects will be appreciated by British readers on account of the clear descriptions of marine organisms and of fishing and processing methods. Specimens of the plant and animal species described and illustrated are preserved in the Muséum National d'Histoire Naturelle, Paris.

The information is perhaps unduly restricted to French sources, but the indications given as to the distribution of the different species, and their popular names in different parts of the French sea-board, and also the technical terms used in the French fishing industry, all conduce to render this volume a by no means negligible work of reference for the geographer as well as the naturalist. J. H. K.

Sea-Shore Life of Britain. By L. R. BRIGHTWELL, F.Z.S., F.R.H.S., M.B.A. 8½×5½. Pp. xii+116. 94 illustrations. [The British Nature Library.] London: B. T. Batsford Ltd. [1947], 1948. 12*s* 6*d.*

A pleasant addition to popular literature on life on the sea-shore, this book will add to the enjoyment of a seaside holiday. A wealth of biological and ecological information is skilfully imparted to the amateur, while the professional biologist will become acquainted with English popular names of organisms more familiar to him in Latin guise. Partans, buckies, and other denizens of the Scottish sea-shore are represented by their English equivalents. On the whole, the book tends to favour the southern half of Britain.

The illustrations assist the reader in the identification of species discussed in the text. J. H. K.

BIOGEOGRAPHY

The Badger. By ERNEST NEAL, M.SC.(LOND.). 8×5½. Pp. xv+158. 12 figs. 1 colour photograph by the author. 29 black-and-white photographs. [New Naturalist Monographs, 1.] London: William Collins, Sons and Co. Ltd., 1948. 12*s* 6*d.*

The editors are to be congratulated on allotting the first of the *New Naturalist Monographs* to Mr. Neal's detailed account of the hitherto comparatively little known life of one of the larger British mammals. Based on many hours of first-hand observation in the field, this careful study will appeal to all interested in wild life. The third chapter, on Classification and Distribution, is of special value to biogeographers. Not only is the distribution of the badger in Britain discussed and mapped, but that of the six recognised genera throughout the world is summarised. The distribution of *Meles meles* and its subspecies in Europe and Asia is also shown on a sketch map.

More than sixty references are provided. Production as well as contents of this monograph have set a very high standard. J. H. K.

EDUCATIONAL

Modern World Geography—Economic and Social. By EARL C. CASE and DANIEL R. BERGSMARK. 8½×5½. Pp. xii+746. Diagrams, sketch maps, photographs. 6 coloured maps. Philadelphia: J. B. Lippincott Company. Revised edition, 1949. 21*s.*

Although this book is written from the American point of view, it has a closely reasoned account of Europe and the importance of Europe in world economy. We fail to understand, however, why polar regions should not be touched on. The rejection of polar regions as barren wastes, outside the purview of the geographer, is quite out of date. In the north at least they are well within the considerations of human economy. This should be attended to in a revised edition. Lists of books and papers for reading are a valuable addition, and there are some useful maps.

R. N. R. B.

A Regional Economic Geography. By SAMUEL NEWTON DICKEN. 10½×7½. Pp. xii+516. 263 figs. End-paper maps. Boston, Massachusetts: D. C. Heath and Company, 1949. London: George G. Harrap and Co. Ltd. 25*s*.

As an introduction to the subject-matter of economic geography this volume can be strongly recommended both to students of geography and to students of economics. In the preface there is a number of good points on 'selling' economic geography and on methods of study. The author classifies production into seven major categories: subsistence agriculture, commercial agriculture, grazing, forestry, fisheries, mining, and manufacture. He then takes up the study of nineteen production types—of which fourteen are agricultural. These types (e.g., Corn Belt type) comprise production regions (e.g., United States Corn Belt), each of which is discussed "against the geographic background of the natural and cultural environments and viewed in the perspective of time." As mining and manufacture are discussed, though more briefly, under agricultural regions as well as in the chapters on these types (e.g., Donbas under Russian Wheat Belt) there is more repetition than necessary and perhaps an impression of greater integration in the regions than may exist in fact. Similar repetitions occur between the chapters on coalfield and manufacturing regions.

Compared with some other American texts this volume has the advantage for non-American readers that the United States is not disproportionately weighted: there are, for instance, three chapters on manufacturing, devoted respectively to North America, Europe, and the Soviet Union. Crop graphs show proportions of area in various regions under different crops, but not enough allowance is made for differences due to size of the total area considered. The maps show disappointingly little, but advantage has been taken of the large format to present some very effective photographs of economic landscape, some of them double-page. Altogether this is one of the most attractive of the 'glossy' geographical text-books.

C. J. R.

GENERAL

The Voyages of Captain James Cook round the World. Selected from his Journals and edited by CHRISTOPHER LLOYD. 8×5. Pp. xxiii+384. End-paper maps. London: The Cresset Press Ltd., 1949. 9*s* 6*d*.

There will always be a demand for the telling of Cook's voyages, especially his own views. Here, in a small volume, are the three voyages in carefully chosen extracts. The text for the first voyage is Cook's own journal printed by Admiral W. J. L. Wharton in 1893. For the second and third voyages the text is taken from Vol. III-VI of the seven-volume edition of 1821, which is a reprint of the official quartos of 1777 and 1781. The extracts are wisely chosen to show Cook's discoveries and his qualities as a navigator. The sketch maps are useful. R. N. R. B.

VANS DUNLOP SCHOLARSHIP

The Vans Dunlop Scholarship in Geography (1950) has been awarded to Mr. ARCHIBALD MACPHERSON, M.A., University of Edinburgh.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

PROCEEDINGS

MEETINGS OF COUNCIL were held on 4th April and 13th June 1950, the President presiding.

Awards.—The Diploma of Fellowship was awarded to Mr. JOHN MCFARLANE, M.A., for his services to Geography and to the Aberdeen Centre of the Society.

The Scottish Universities Medal was awarded to THOMAS IAN RAE, First Place, General Classes, 1949-50, University College, Dundee, University of St. Andrews; JOHN W. CHAMBERLAIN, for consistently excellent work throughout the first three years of the Honours Course, 1948-50, Glasgow University; RONALD STANLEY GOODWIN, for excellent work in the Honours Courses, 1948-50, Edinburgh University.

ANNUAL GENERAL MEETING

The Annual General Meeting will be held in the Society's Rooms in Edinburgh on Tuesday, 3rd October 1950, at 4 P.M.

LECTURE SESSION, 1950-51

OCTOBER-DECEMBER, 1950

EDINBURGH, *Usher Hall*

EVENING MEETINGS, at 7.30 P.M.

October 12th. L. SLATER, M.A., on "South East Asia at the Cross Roads." Illustrated. Mr. Slater served under Lord Louis Mountbatten on the Staff of South East Asia Command.

November 16th. ANDREW C. O'DELL, M.SC., on "Portugal—Land of Contrast." Illustrated. Dr. O'Dell, Head of the Geography Department at Aberdeen University, made a tour of Portugal in 1949, noting particularly features of settlement and transport.

December 14th. DONALD GUNN, D.SC., PH.D., on "Locust Plagues." Illustrated. Principal Scientific Officer of the Anti-Locust Centre, London. Dr. Gunn went to Kenya in 1945 to study locust behaviour and aircraft spraying.

Central Hall, Tollcross

AFTERNOON MEETINGS—Wednesdays, at 3 P.M.

October 18th. HAROLD SKELTON, on "The Rhineland." Illustrated.

November 1st. S. J. JONES, M.A., on "California." Illustrated.

November 22nd. Dr. A. B. FLETT, F.S.A.(SCOT.), on "South Uist—The Isle and its People." Illustrated.

December 6th. H. P. WHITE, B.A., on "Formosa—Chiang's Last Bastion." Illustrated.

December 20th. J. T. SMITH, on "A Visit to Finland." Illustrated.

The Society's Rooms

CURRENT GEOGRAPHICAL PROBLEMS

Wednesdays, at 5 P.M.

This series is designed to crystallise current geographical problems. Though there is no obligation to take part in the discussions that follow, it is hoped that members will take the opportunity of putting forward constructive views and opinions.

October 25th. JOHN BEWSEY, on "Artificial Rain."

November 29th. R. COMMON, B.SC., on "Some Geographical Aspects of the Morphology of the Cheviot Area."

JUNIOR MEMBERS' MEETINGS—Tuesdays, at 7.30 P.M.

October 17th. JAMES HOSSACK, M.A., B.COM., on "Industrial Film."

November 21st. RONALD MILLER, M.A., PH.D., on "Life on the Edge of the Sahara."

December 19th. J. MACQUEEN COWAN, D.SC., F.R.S.E., on "Lumbering."

Synod Hall

FILM SHOWS FOR YOUNG PEOPLE

Saturdays, December 23rd and 30th, at 10.30 A.M.

GLASGOW, *Lyric Theatre*, at 7.30 P.M.

October 11th. L. SLATER, M.A., on "South East Asia at the Cross Roads." Illustrated.

November 15th. ANDREW C. O'DELL, M.SC., on "Portugal—Land of Contrast." Illustrated.

December 13th. HAROLD SKELTON, on "The Rhineland." Illustrated.

ABERDEEN, *Y.M.C.A. Hall*, at 7.45 P.M.

October 10th. The Rt. Hon. Lord TWEEDSMUIR, O.B.E., LL.D., F.R.G.S., on "Arctic Posts of the Hudson Bay Company." Illustrated.

November 14th. RONALD MILLER, M.A., PH.D., on "The Hausas." Illustrated.

December 12th. S. J. JONES, M.A., on "California." Illustrated.

DUNDEE, *Training College Hall, Park Place*, at 7.30 P.M.

October 11th. The Rt. Hon. Lord TWEEDSMUIR, O.B.E., LL.D., F.R.G.S., on "Arctic Posts of the Hudson Bay Company." Illustrated.

November 15th. RONALD MILLER, M.A., PH.D., on "The Hausas." Illustrated.

December 18th. ANDREW C. O'DELL, M.SC., on "Portugal—Land of Contrast." Illustrated.

NEWBIGIN PRIZE: 1951 AWARD

A Bronze Medal and Money Prize will be awarded for the best Essay, suitable for publication in *The Scottish Geographical Magazine* and not exceeding 7000 words in length, on any subject relating to the geography of Scotland.

Essays, typed and with any illustrations prepared for reproduction, in envelopes marked "Newbigin Prize," must be lodged with the Secretary, Royal Scottish Geographical Society, Synod Hall, Edinburgh 1, on or before October 31st, 1951.

NOTICE

The following numbers of *The Scottish Geographical Magazine* are out of stock and are very urgently required:—Vol. **2**, No. 3; Vol. **13**, No. 11; Vol. **19**, Index; Vol. **20**, No. 5; Vol. **22**, No. 6; Vol. **26**, No. 3; Vol. **34**, Nos. 3, 4, 10, 12; Vol. **35**, Nos. 1, 3, 8, 9; Vol. **36**, No. 1; Vol. **37**, No. 1; Vol. **41**, Nos. 2, 6; Vol. **47**, No. 6; Vol. **53**, No. 1; Vol. **58**, Nos. 1, 2, 3; Vol. **59**, Nos. 1, 2; Vols. **58-59**, Index; Vol. **60**, No. 2; Vol. **61**, No. 2.

All bound volumes will also be gratefully accepted. It would be much appreciated if such copies of separate numbers and of volumes be handed without delay to the Secretary.